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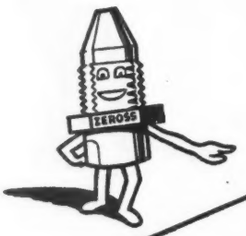
THE ARCHITECTURAL REVIEW
volume ninety-nine number 591

THE LIVERPOOL AND MANCHESTER RAILWAY'S **FURY** 1838

SECTION THROUGH THE FURY



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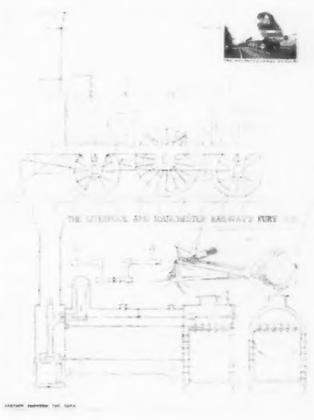
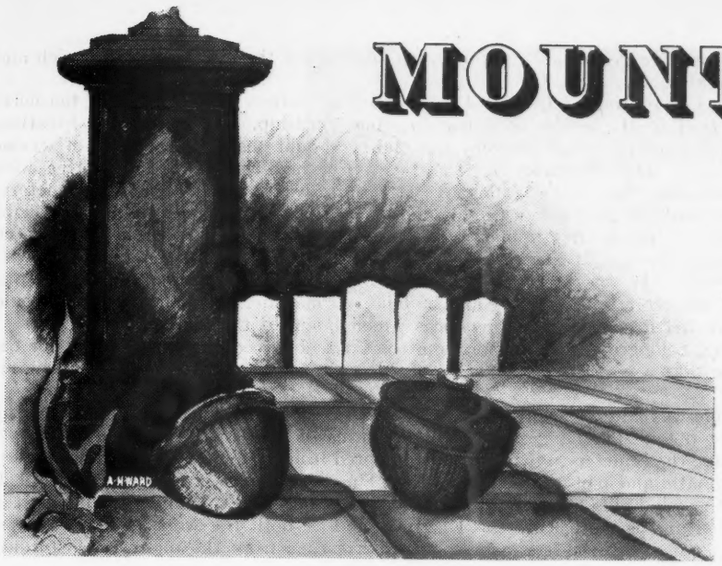
THREE SHILLINGS AND SIXPENCE

THE COVER. It was in the second quarter of the nineteenth century that engineering reaped its peak achievements in romantic functionalism. This fusion of an almost "artless" art with a strongly imaginative science, produced work which should have been the envy of future generations, but has often been ignored by them. As Dr. Martin shows in his article (*Unit Built Stations*, pages 77-83), the designers of the LMS Experimental Unit Station have not been insensible to the nineteenth century contribution, in fact, their solution is a direct development from it. That the lesson to be learnt is no less valuable where the bias is more towards the art of landscaping than the science of building, is clear from the Appendix to his article (*The Functionalist Sharawag*, pages 84, 85), which shows the quite extraordinary combination in the nineteenth century engineer of a sensitive eye with a keen mind. About the Liverpool and Manchester Railway's FURY it is more dangerous for an architect to theorize, but it should be enough to feel the delight of the draughtsmanship and the adventure in the design.





MOUNT QUARRY

AN ACCOUNT OF THE VICISSITUDES OF A LIVERPOOL ROCK SINCE 1767

ROY CHRISTY AND A. NEVILLE WARD

James Wood the younger, of Bath, about to begin the construction of Liverpool's new Corn Exchange in 1748 may well have climbed Duke Street (a somewhat difficult climb even for the very young) entering Mount Quarry by the tunnel carved through the quarry face, with a view to examining the yellow stone, keuper, in which his building was to be erected.

See him there, seated upon a rough hewn rock, hand delicately poised over silver snuff-box, an architect fresh from the polite society of the south, and imagine the distaste with which he must have viewed the desolate sight before him; for the quarry was much used, and had already scarred what was otherwise a pleasant and fashionable suburb.

The visit must, however, have proved fruitful, for the Exchange was constructed like many other buildings before and since from this curved sandstone ridge which forms the very backbone of Liverpool city.

Two tall windmills, one at either end of the quarry, both standing on elevated escarpments, combined to relieve in some measure the dismal nature of the scar, and if one had a mind to forget, as many of the wealthier citizens did, two nearby houses of entertainment provided diversion by way of a game of bowls.

Interrupting such a game one could gaze beyond the valley below with " chimney shafts vomiting forth the dense columns of smoke which hung over the city like a sable pall " and enjoy the prospect of " The spires, towers and domes in the town itself shooting up above the common level of the buildings, the expanse of the Mersey, the estuary of the Dee, Bidstone Hill with its Mill and Lighthouse, the ocean in its majesty of calm or storm, and the distant range of the Welsh Mountains terminating the perspective."

Until 1767 Mount Quarry remained unremarkable both historically and æsthetically. Its stones, could they have spoken, would have had little to tell; but not so a hundred years later, for in the winter of that year the period of changes began.

The winter of 1767-8 was unbelievably severe, the price of bread was high and many of the citizens of Liverpool were miserably poor and without work. The Mayor of Liverpool, Sir Thomas Johnson, who entertained a benevolent desire to mitigate the sufferings of the poor, persuaded the Corporation to employ a large number of unoccupied hands in building up an embankment from the debris of the quarry. This embankment and the grass slope below it linked the two escarpments supporting the windmills. It rose to a level plateau which was formed into a beautiful pleasure ground and plantation in one portion of which an artificial mound was constructed commanding the finest of views; a view no longer marred by the unsightly heaps of rubbish in the quarry below.

So much did the townspeople think of their achievement that the hill was now given the inspiring title Mount Zion, a title which might well have remained to this day had not a wit of the time (reputed to be a member of the cloth) published the following *jeu d'esprit*, in which he expressed his indignation at the profanity of calling the site of a public-house by this name :—

" The Mayor and Council in a dreary fit
To slight the scriptures, and to show their wit,
The name of Zion, sacred seat of Heaven
To this unhallowed spot have given
Fond of impiety behold a shrine
They've dedicated to the God of wine
And to excite our admiration more
See ' bottled beer ' recorded on the door.
But thou who answered the poor man's prayer
Protect the innocent and guard the fair,
And if thou canst forgive, forgive the mayor."

Perhaps this clergyman was really demanding that the name should remain and the public-house be removed, but by way of compromise the name was removed and the public-house remained. After the building of St. James's Church in 1774 the place became known as St. James's Mount, and the blasphemy was in part erased.

While the mount was flourishing as a place of fashionable parade the quarry was beginning to achieve fame by virtue of a spring that flowed from its side. This spring was reputed

Left, the rough-hewn, tunnelled entrance to the cemetery of St. James's, Liverpool. The sooty keuper stone provides a sombre and magnificent setting for tomb and mausoleum. In the background is the enormous escarpment ascended by double ramps, with the contrasting elegance above of the classical terrace houses in the same keuper stone.

to have great curative properties for those with ailments of the eye, and from it rich and poor alike sought relief.

By 1825 the Corporation of Liverpool was becoming restless at the waste of ten acres of excavated land in the centre of a fast growing township. The Reverend Jonathan Brooks finally devised a scheme whereby the quarry should become once more of service to the community. On September 7, 1825, he approached the Council by letter with a view to purchasing the quarry and converting it into a Church of England cemetery. The disgraceful state of graveyards in England's larger towns had recently been brought to the attention of the general public, and the Necropolis in Liverpool had just been opened by the Protestant Dissenters. The Reverend Brooks' suggestion met with considerable approval. It was agreed that the site was admirably suited for picturesque effects, that a massive retaining wall could be built on one side, and that catacombs could easily be excavated in the scarped precipices which bounded the land.

Since the land belonged to the Corporation, the Council agreed to appropriate it for the purpose and to take a portion of the shares of a joint stock company formed to carry out the plan.

The first stone was laid on August 28, 1827, and the first interment took place to the accompaniment of one of the greatest thunderstorms of the century, in June, 1829.

From this time the cemetery advanced uninterrupted from fancy to fancy until it achieved its present dramatic and picturesque condition. The catacombs were duly formed, filled, and sealed; the windmills were replaced, one by a small Greek Temple serving as the mortuary chapel and the other by the Keeper's House—both the work of John Foster. The tunnel, once used by the workmen to transport stone from the quarry, was formed as the entrance to the new repository.

Of the many outward signs of affection and memory which eventually adorned this cemetery one stands out by virtue of its size and history.

September 15, 1830, marked the beginning of a memorable epoch for the citizens of Liverpool. The Duke of Wellington, Prince Esterhazy, Sir Robert Peel, Lords spiritual and temporal, and celebrities from all walks of life forgathered to witness the opening of the Liverpool to Manchester Railway.

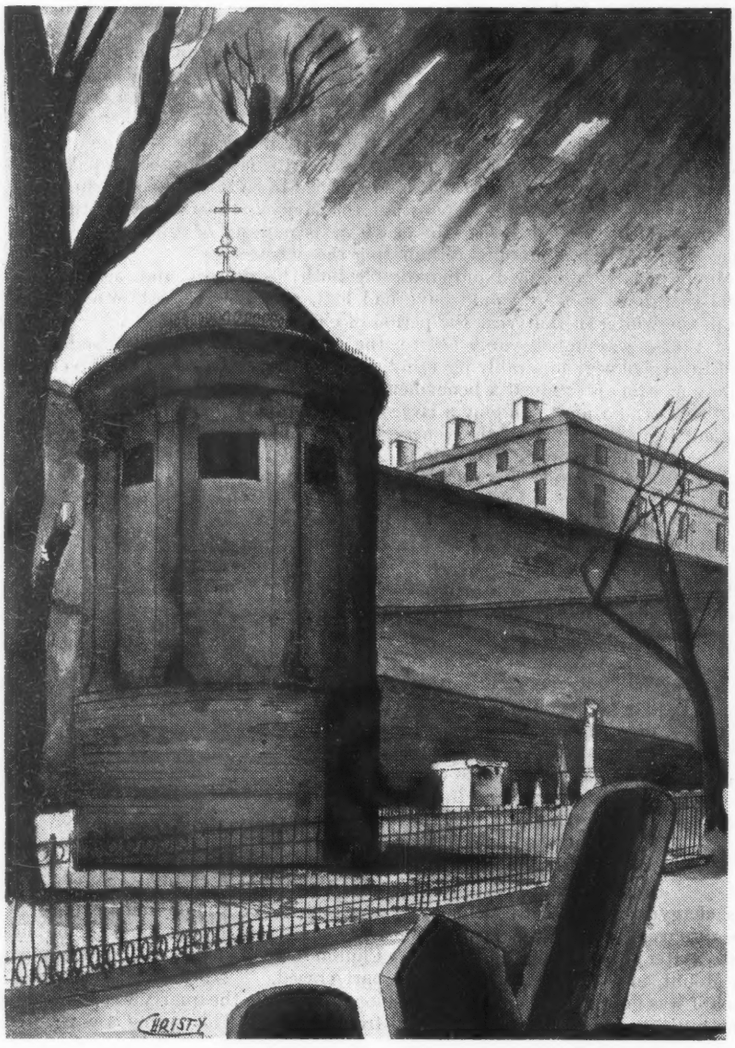
Among this gathering was Mr. Huskisson, Member of Parliament, friend of the people, and a most enlightened statesman, who had dragged himself from a sick-bed in his anxiety to do honour to the occasion. Mr. Huskisson and the Duke "warmly embraced the opportunity for a friendly recognition during a temporary stoppage of the trains, when the cry was raised 'Take care an engine is coming.' Mr. Huskisson, with enfeebled body, and nerves unstrung by sickness, became flurried, missed his footing in attempting to ascend and fell on the rails just as the engine, 'The Rocket,' came up, passing over his leg, from the effects of which accident he died in a few hours."

On September 24 his remains were interred in the cemetery following a procession in which "all seats and parties vied with each other in paying the utmost respect to the memory of the departed statesman." Following a public meeting £3,000 was subscribed for a monument to his memory. It took the form of a circular mausoleum enclosing a marble statue of the deceased by the eminent John Gibson, R.A., and this mausoleum stands in the very heart of the cemetery.

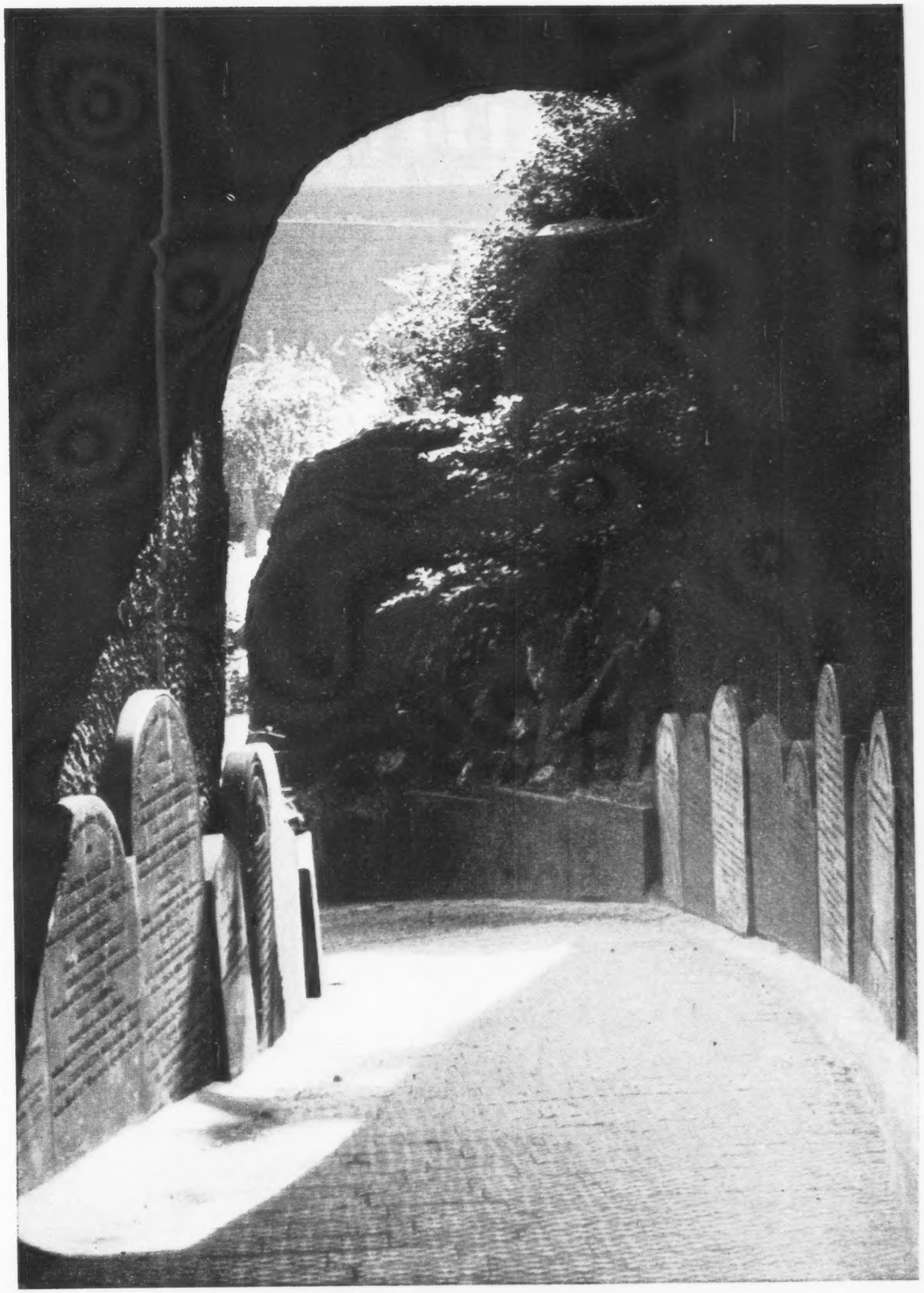
Today, the property which surrounds the cemetery, once the most exclusive residential district of the city, is already turning to an untidy dissipation, and the gardens of pleasure, where once a cheerful throng made merry through the night, are now covered by the mass of Liverpool's new Cathedral.

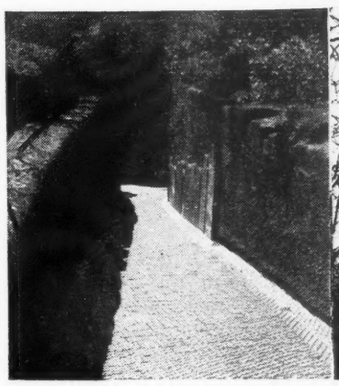
Many have been the proposals for the future. A bridge over the cemetery to the eastern doorway of the Cathedral or the conversion of the whole area into yet another spacious park are but two of them.

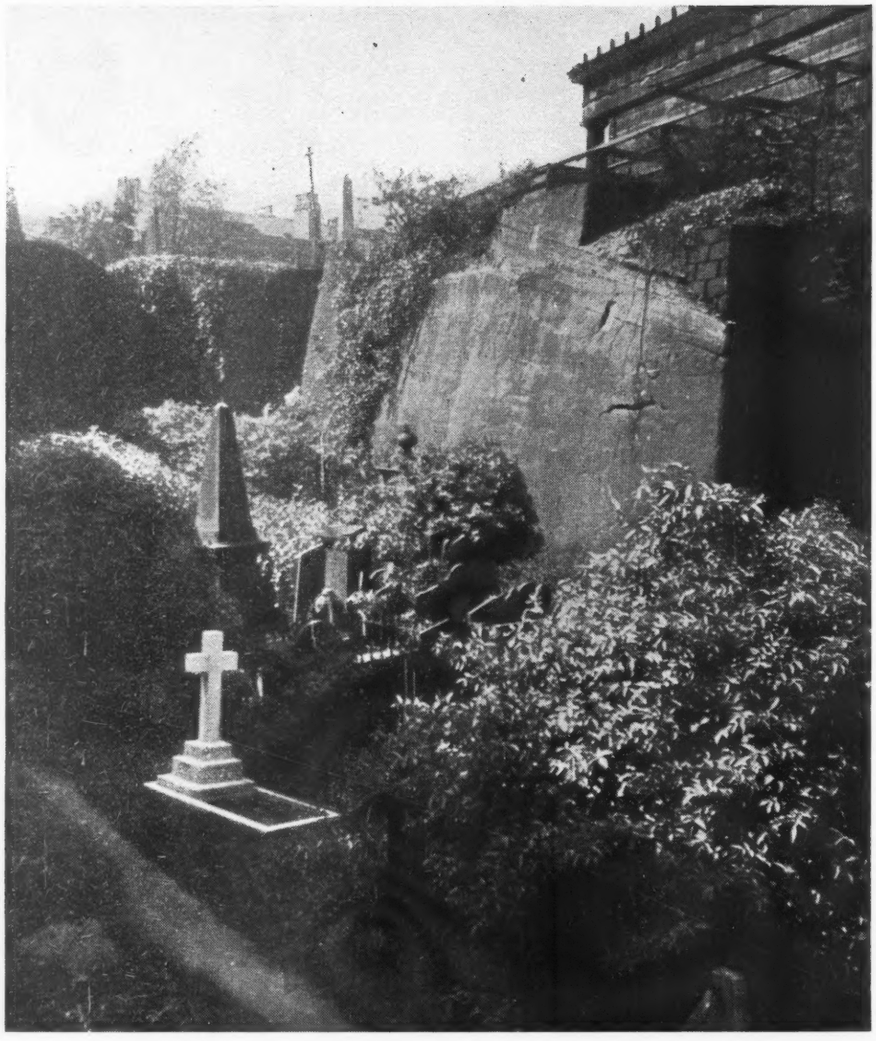
It would, indeed, be unfortunate if this, one of the most picturesque sights in Liverpool and one which, as it exists today, provides a unique setting for the new Cathedral, were to be swept away.

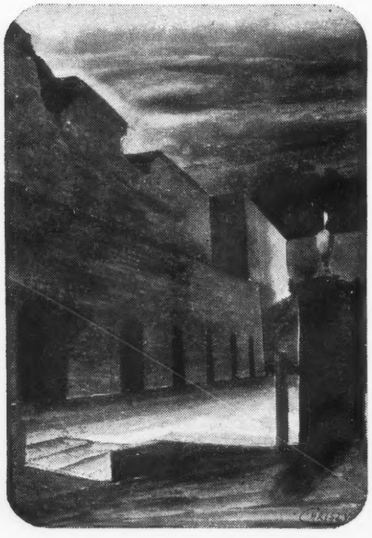


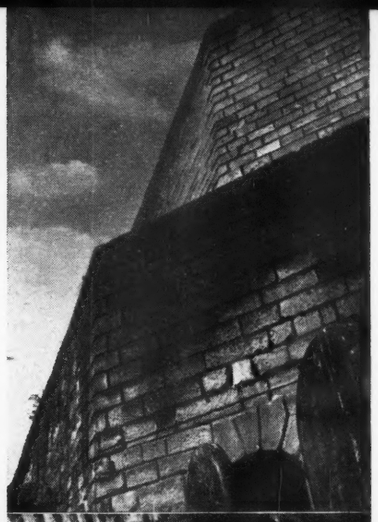
Left is the monument to Huskisson, who died as a result of an accident which took place during the opening of the Liverpool to Manchester Railway in 1830. In the background are the great ramps which give to the cemetery so much of its character. On the facing page, lower right, is the new Cathedral, which towers up on its rock above the cemetery.

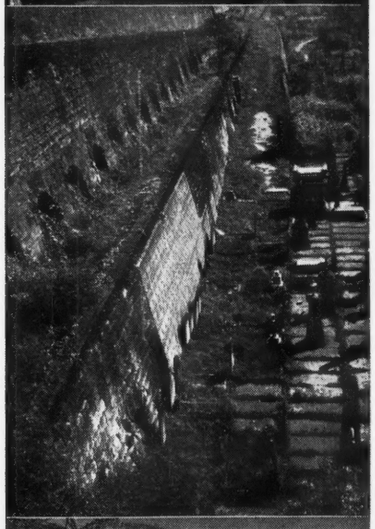


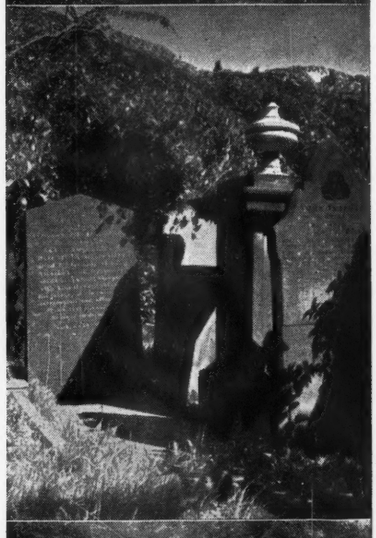




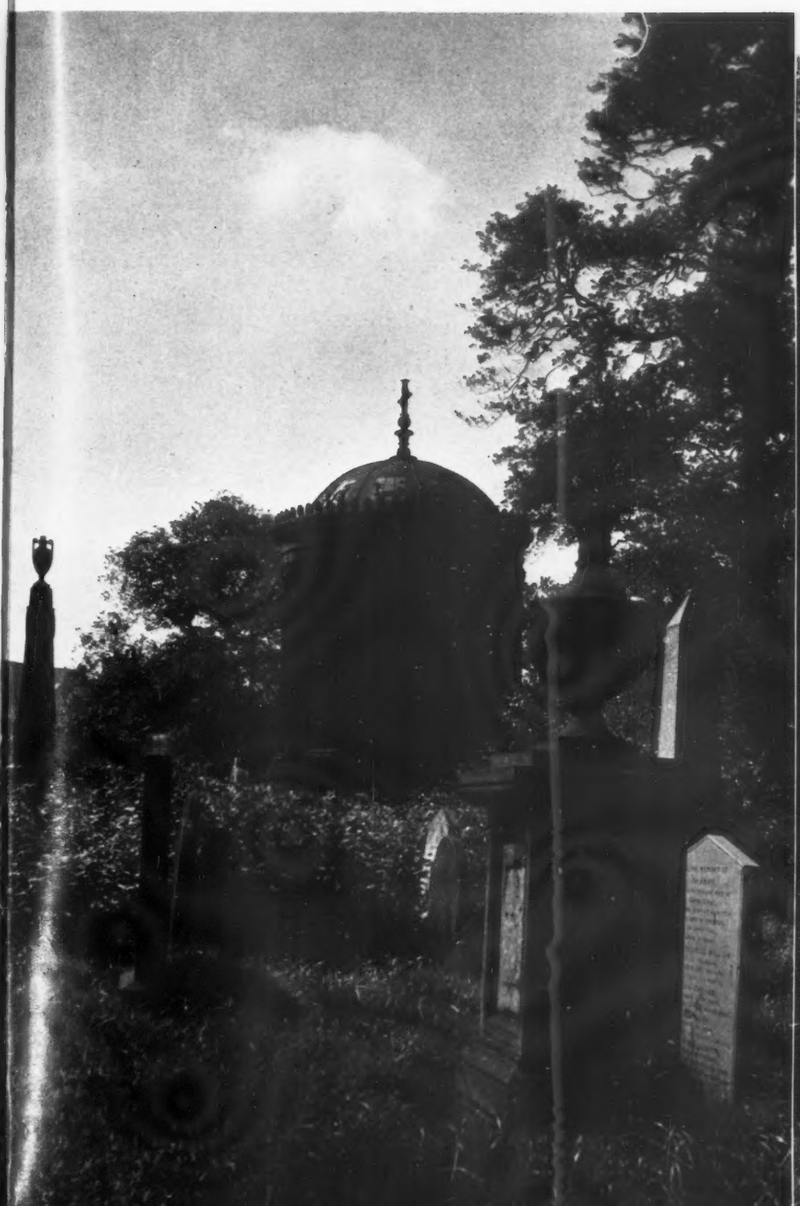


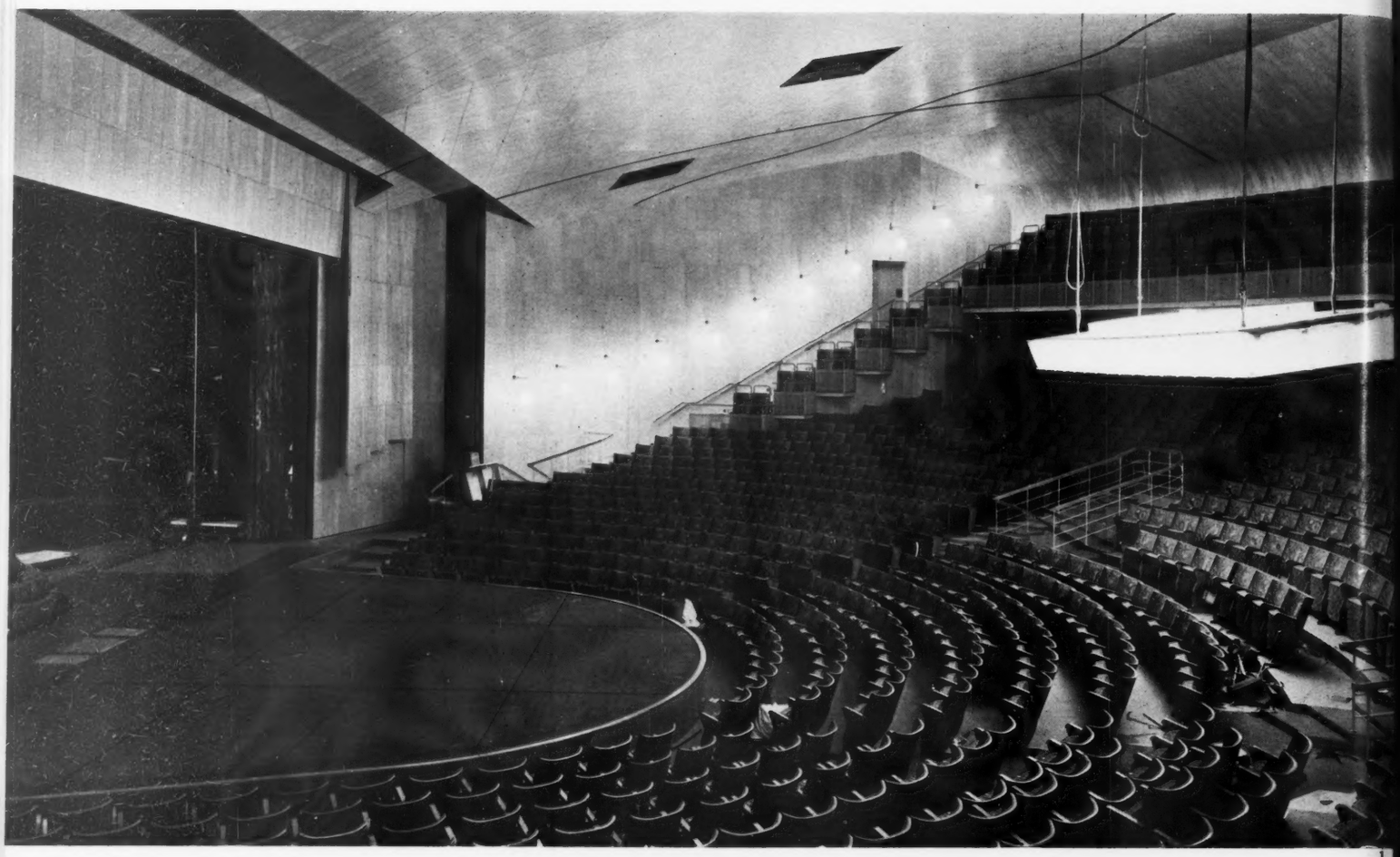






Above is a corner of the cemetery, dominated by one of the Greek Temples which were built by John Foster to replace the two windmills formerly standing at each end of the quarry. The top three of the series of pictures on the right show different aspects of the enormous ramps by which the visitor descends into the cemetery from the Mount. From this side there is a magnificent view across the cemetery to the cathedral, standing high on a tree-covered hill. This is ascended by a steep, winding path starting at the tunnel opening shown in the right-hand picture on the facing page, and ending at the eastern door of the cathedral.





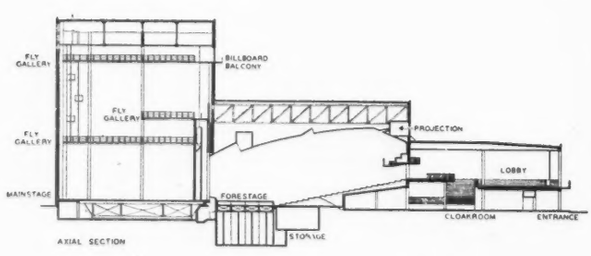
1 shows the auditorium which can be adjusted to seat an audience of either 1,200, 800 or only 400, by moving suspended laminated screens. In the centre is the projecting apron stage, claimed to be the first of its kind in Europe.

THEATRE AT MALMÖ

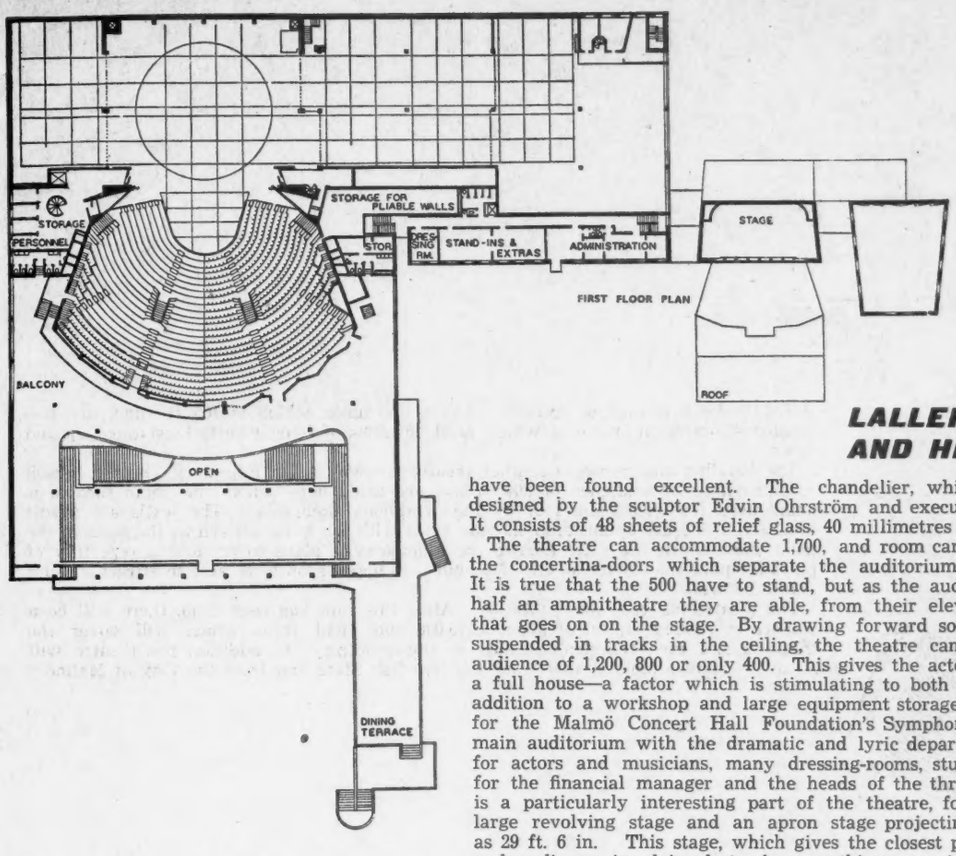
article by Arla Breithel

Malmö is Sweden's third largest city with about 170,000 inhabitants. It is also the seat of the provincial Government of fertile, wealthy Scania, which is one of the most densely populated parts of the country. When designing the new theatre, therefore, the promoters have not only taken Malmö's own population into account but the entire province's —one might even say the whole of South Sweden's population. The question of providing Malmö with a new theatre had long been a burning one when the decision to start building was finally reached in February 1941. For various reasons it took three-and-a-half years for the new theatre—which is also to serve as a concert hall—to be completed. In front of the building there is a wide open space, paved with white marble; in the pool at one side of it there will finally be a fountain in bronze representing figures from famous plays. Both the lower storeys of the facade are faced with grey marble, the entire panels between the stanchions being of plate-glass. The doors of the main entrance are of glass and stainless steel, and the floors of the booking-hall and the vestibule of black marble. The outer vestibule is separated from the inner by large swing-doors of glass. In the inner vestibule are the cloakrooms, the counters of which have a total length of nearly 400 feet. In the middle of the vestibule, flanked by two broad marble stairs, which lead up to the foyer, stands Thalia, a work by Bror Marklund; he presents her full of life and, in deliberate contrast to convention, as slightly vulgar. The staircases leading up to the foyer are bounded by a white wrought-metal railing, which also runs round the foyer. This balustrade is repeated in the balcony. Along the inner wall of the foyer, beneath the balcony, runs a long series of concertina-doors, which lead to the auditorium, while four doors in the inner vestibule lead to the lower stalls. Another three doors connect the foyer with a terrace communicating with the restaurant terrace, which seats 200 guests.

Many donations have been given towards the decoration of the theatre. Along the walls of the foyer runs a great terracotta relief—Theatre Cavalcade, and a mural decoration of painted faience tiles; both of these have been executed by Rörstrands Pottery Works. Two statuettes and a bust of Strindberg sculptured by Carl Eldh have also been set up in the foyer, and, finally, the Malmö Museum has donated a large number of paintings from its rich collections. In spite of its size, the auditorium has an air of intimacy. Walls and ceiling are panelled in pale maple, and the seats are covered with rose-coloured upholstery in a carnival design. The famous Elsa Gullberg Textile Studio in Stockholm has supplied the great hand-printed curtain, on which figures from the world of the theatre and of music frolic in black-and-white disorder against a rose-coloured background. The acoustics in the theatre



AXIAL SECTION

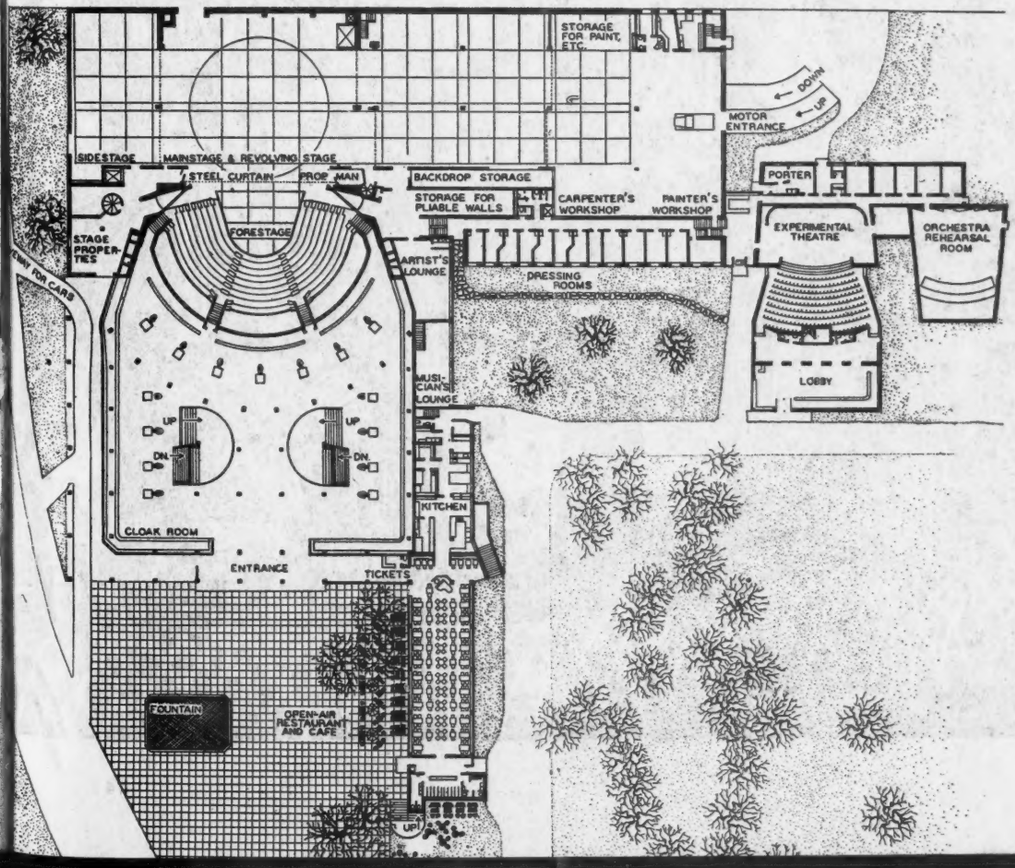


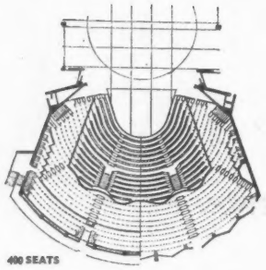
LALLERSTEDT, LEWERENTZ AND HELLDEN

have been found excellent. The chandelier, which hangs from the ceiling, was designed by the sculptor Edvin Ohrström and executed by the Orrefors Glass Works. It consists of 48 sheets of relief glass, 40 millimetres thick.

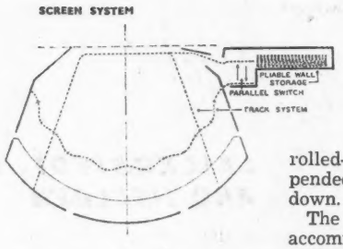
The theatre can accommodate 1,700, and room can be found for a further 500 when the concertina-doors which separate the auditorium from the foyer are drawn aside. It is true that the 500 have to stand, but as the auditorium is built in the shape of half an amphitheatre they are able, from their elevated position, to see everything that goes on on the stage. By drawing forward some laminated screens which run suspended in tracks in the ceiling, the theatre can be made to accommodate an audience of 1,200, 800 or only 400. This gives the actors a chance of always playing to a full house—a factor which is stimulating to both the actors and the audience. In addition to a workshop and large equipment storage space, there is a rehearsing room for the Malmö Concert Hall Foundation's Symphony Orchestra, which shares the main auditorium with the dramatic and lyric departments of the theatre, greenrooms for actors and musicians, many dressing-rooms, studios of various kinds, and offices for the financial manager and the heads of the three artistic departments. The stage is a particularly interesting part of the theatre, for it comprises both an unusually large revolving stage and an apron stage projecting into the auditorium by as much as 29 ft. 6 in. This stage, which gives the closest possible connection between actors and audience, is claimed to be something new in Europe, and has made great demands, hitherto inexperienced in Sweden, on both actors and ballet; for when performing on it they have to work "sculpturally" right in the middle of the audience, and it has been necessary to devise an entirely new method for the purpose. The proscenium is divided into four sections, each of which can be raised or lowered independently of the others. When the proscenium is elevated, the ordinary footlights can be lowered into the floor, and the lighting is then supplied by beamlights inset in the roof of the auditorium. The base of the proscenium is 39 ft. wide and the diameter of the revolving stage is 66 ft. The revolving stage runs on rails, and rails also lead from the wings to the stage proper. This allows the plastic scenery to be transported complete on to the stage on trolleys, the longest of which is 79 ft. The great cyclorama (the largest backcloth in Sweden) is lifted instead of being

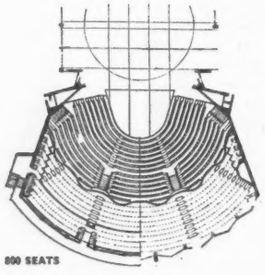
GROUND FLOOR PLAN



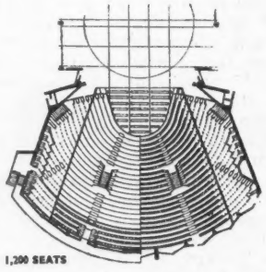


400 SEATS





800 SEATS



1,200 SEATS

rolled-up for a change of scenery. Above the stage, which is 105 ft. high, are suspended 48 yards of material which need 25 miles of steel wire to hoist them up and down.

The building also houses a smaller theatre, known as the Repertory Theatre, which accommodates an audience of 204. Plays are acted here when the main theatre is being used for lyrical plays or by the symphony orchestra. The walls are a soft blue and the seats upholstered in blue cloth with the same pattern as the seats in the main theatre. In the little theatre the Management plans to produce a repertory of plays intended mainly for an élite few, but it is hoped soon to be able to attract a wider public as well.

The theatre has cost about £350,000. After this sum has been paid, there will be a balance of funded capital of about £175,000 the yield from which will cover the theatre's and the orchestra's rentals in the building. In addition the theatre will receive certain annual grants from the Swedish State and from the City of Malmö.

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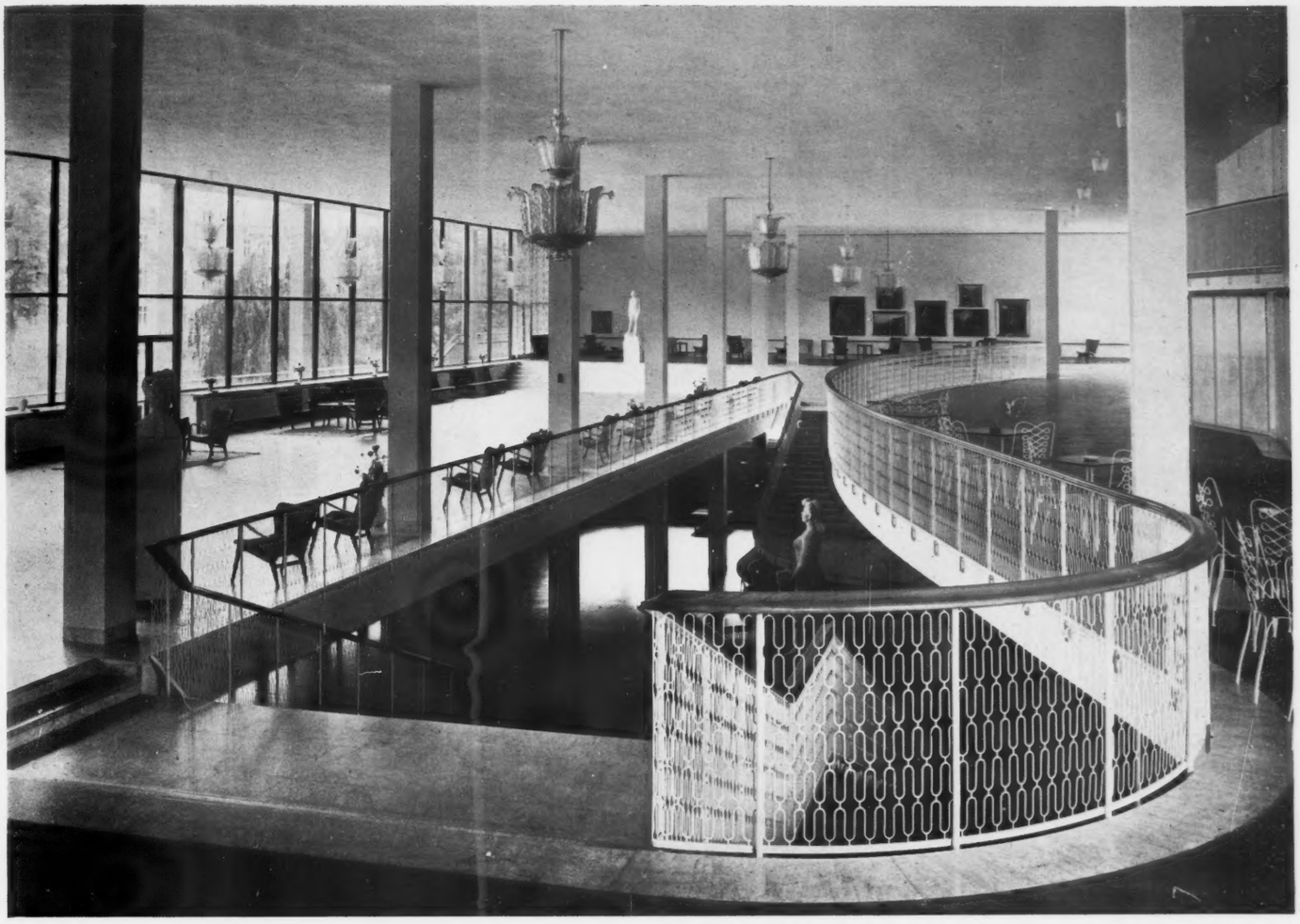

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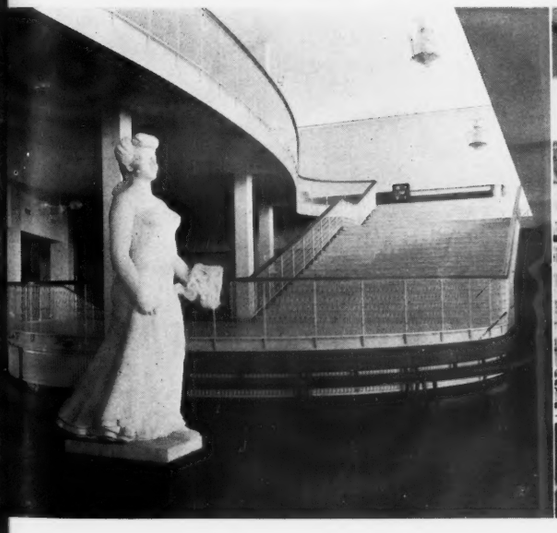
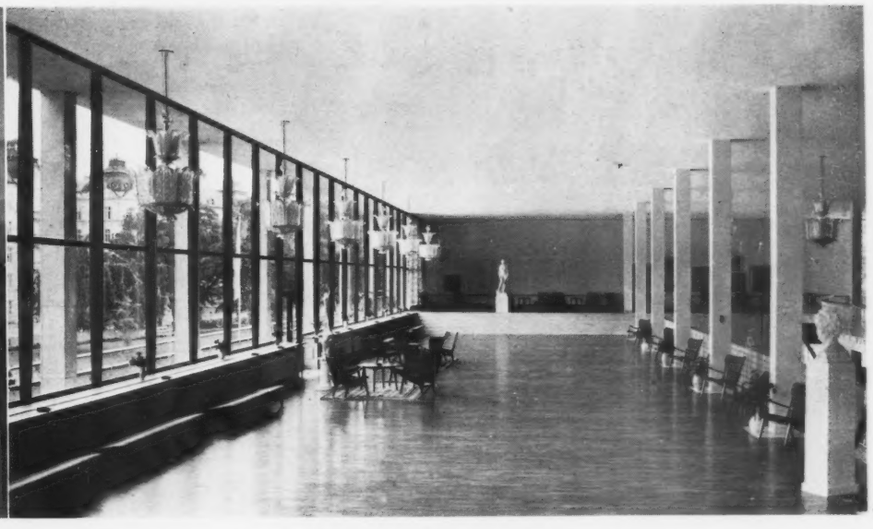


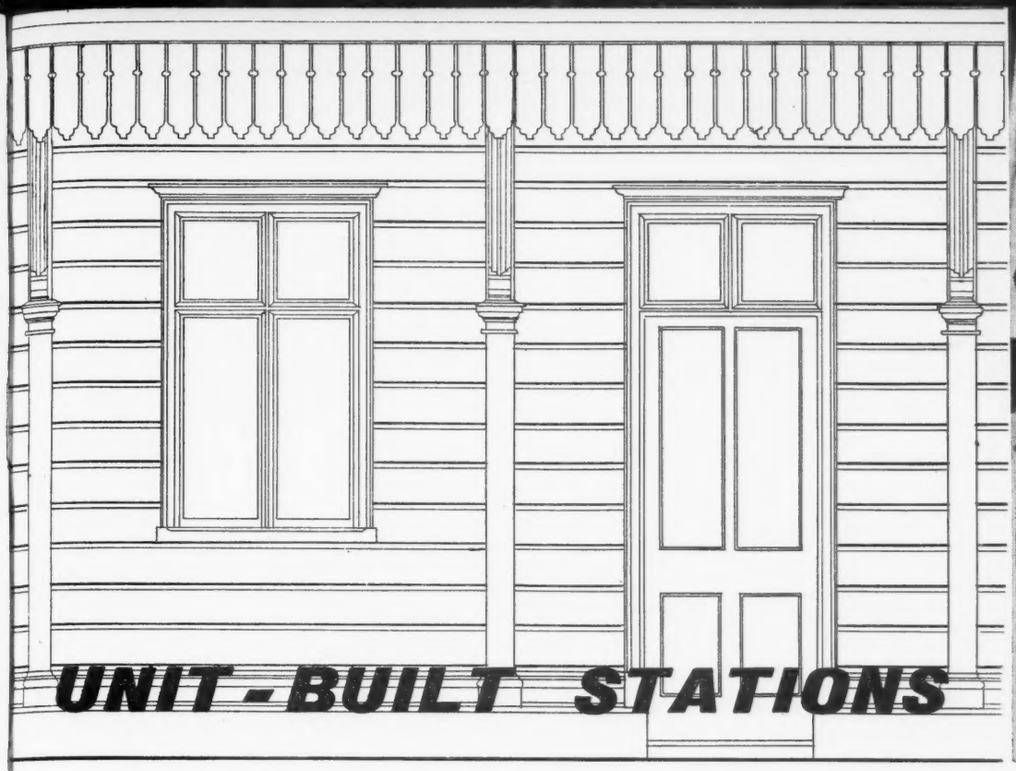


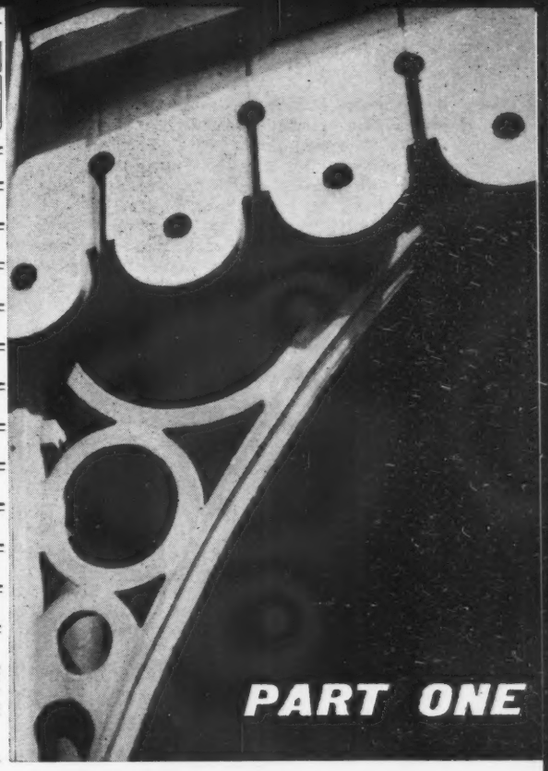
4, 5

2, on the facing page, shows part of the long hand-printed stage curtain by the Elsa Gullberg Textile Studio in Stockholm; the figures are in black and white on a rose-coloured background. 3, the main staircase with its white wrought - metal handrail, from the first-floor foyer. 4, the statue of Thalia by Bror Marklund, at the foot of the main staircase, and 5, another view of the first floor foyer. 6, 7 on the following page show the main front of the theatre across the marble-paved square.

6

7





UNIT-BUILT STATIONS

PART ONE

THE EARLY DEVELOPMENTS

In a previous article the various architectural aspects of railway romanticism were considered. Here Dr. J. L. Martin describes some early developments in the first real railway stations, that is to say the first stations which gave expression not only to the new function of arrival and departure by rail but also to the new building techniques the success of which so largely depended on rail transport. The purpose is to place the development of the LMS Experimental Unit, which is described in Part Two, in its true historical perspective, and to draw lessons from past experience in the visual planning of stations, for consideration in Part Three. An appendix on page 84 illustrates the astounding beauty of the early railway in the South Devon landscape, an example of a great English achievement in romantic functionalism.

> " . . . in those days I say, when there was something more to be remembered in each successive halting place than a new arrangement of glass roof and iron girder."

IN these words Ruskin dismissed the railway station. So, too, he dismissed, when he saw it, the Crystal Palace, in spite of the fact that he had written that " there is no law, no principle based on past practice which may not be overthrown in a moment by the arising of a new condition or the invention of a new material." " The time is probably near," he wrote, " when a new system of architectural laws will be developed, adapted entirely to metallic construction."(1)

The railways and the new forms are clearly associated in Ruskin's mind. At the time that he wrote many of the great engineering works had been completed. Large viaducts had been built across the countryside. The tubular bridges at Conway and across the Menai Straits had recently been constructed. As far as stations themselves were concerned the old shed roofs over the Euston tracks had been built some years earlier and the great spans of King's Cross were being erected, and were probably in Ruskin's thoughts as he wrote. The " new arrangements of glass roof and iron girder " were indeed to become one of the most striking characteristics of the Railway Station. But to apply this generality to every halting place presents a completely false picture of the scene before 1850 and Ruskin's statement is in fact more prophetic than true.

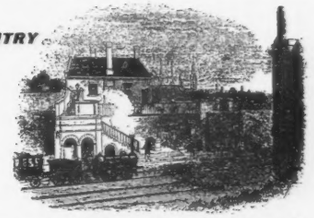
Mr. J. M. Richards in an article published in this Review(2) called attention to the extent to which railway architecture had a local and even domestic aspect. In the great viaducts and the tunnels, it is true, there is romanticism on its grandest and most dramatic scale; but as the railway passes through what Mr. Richards calls a " thoroughly humanised countryside," there is romanticism of another kind—a small-scale affair of make-believe by means of which the local station might be a lodge or cottage on the squire's estate. By these homely and reassuring means, the railways, which held in many ways more than a hint of terror for ordinary people, insinuated themselves into the landscape.

The design of such buildings before the year 1850 would make an interesting study. Loudon, in his *Encyclopædia of Architecture*, published in 1833, illustrates several—for example Belper, Ambergate and Wingfield between Derby and Claycross and Eckington on an adjacent branch line. They were designed by the architect Francis Thompson. In both plan and elevation they were typical houses of the period—" cottages " they were called by Loudon, " which, with an additional room or two . . . might be rendered fit for the occupation of a gentleman with a small family." In their romantic flavour they are not in fact dissimilar to Robinson's *Designs for Lodges and Park Entrances*, which were published in the same year. The stylistically ambidextrous Robinson has designs for all tastes and localities. The architecture of the smaller railway station is no less varied and accommodating; the old Midland line is rich in local styles, and even the great classical tradition of the London & Birmingham Railway is capable of subtle nuances of style which give to each building a character appropriate to its surroundings; compare, for example, the simplicity of the early railway houses at Boxmoor with their urban counterparts at Rugby.

But we must remember that at this date the smaller station was still a free-standing structure adjacent to the line itself(3) and even below its level as at Boxmoor, or above it as in the early station at Coventry where the platform was approached by an imposing double flight of steps. The problem of sheltering the passenger on the platform itself, and in particular the problem of the platform awning had still to be solved. The well-known illustration of Pangbourne Station (p. 78), built in 1839, shows how the rural character of the cottage with its steeply pitched roof is at once changed by the addition of the cantilevered awning. The station of this kind becomes a hybrid—providing one type of cover by traditional means and the new requirement of platform cover by novel method, and before long with the aid of new materials, as at Chapel-en-le-Frith.

The problem of platform cover with its large spans and cantilevers is one that would have called for the use of iron and steel even if the railways themselves (with their possibilities of transporting quantities of heavy goods) had not been the means of making their use more widespread.

If ironstone could be brought from Cumberland, from Wales and from Northamptonshire to feed the forges of Staffordshire, the iron which



these forges produced could be taken back again just as easily. The early romanticism of railway architecture, which for a moment attempted to make the railways more commonly acceptable, was foredoomed to failure since the railways themselves were the means by which industrialism was carried abroad and the revolution made

(1) *The Seven Lamps of Architecture.* Introductory, para. 2 and Chapter II, para. ix.

(2) *Domesticating the Iron Horse*, by J. M. Richards, ARCHITECTURAL REVIEW, June, 1942.

(3) A contemporary description in *The Roads and Railroads of Ancient and Modern Countries*, written in 1839, gives a fairly accurate picture of the accommodation provided:

" The stations actually in use in our various railways are of different characters. In some cases the station is merely a room, which serves both for office and waiting room from which the passengers and parcels from a small town or village can be taken upon the railway. . . . But generally speaking the stations are of greater extent; they contain an office for transacting business and one or more waiting rooms. A useful suggestion has lately been made in an article in the *Encyclopædia Britannica*; *viz.*, that there should be a separate waiting room for ladies, with a respectable female to attend them and to provide them with refreshments at a moderate price. . . . The arrangement of these stations . . . ought always to be, if practicable, such that passengers can step from a platform into the carriages without either ascending or descending; and . . . the whole of the passengers while entering or leaving the carriages should be protected overhead by a roof thrown across the railway."

The description goes on to suggest that passengers leaving the train should do so on the opposite side of the coach to those entering; a reference to the possible simplification of entraining passengers' merchandise, horses and carriages also makes it clear that at this time the railway station had progressed very little beyond a road and rail junction separated by a building.

widespread. It is in this sense that Ruskin with justification could attribute to the railway station as a sign and symbol those products of industrialism " the glass roof and iron girder."

The more general use of iron made possible by the railways was certainly accelerated by the need for the platform awning. The need to give passengers more adequate protection and accommodation arose with the growth of the number of passengers and the development of the railways themselves. The length of line between Euston and Bletchley provides a good example to quote. In this case the original up and down services were improved by the opening of a third line in 1859. In 1875 a fourth line was opened, thus introducing fast and slow passenger lines. Passenger accommodation alongside the original line had necessarily to be extended by accommodation on two further platforms in order to meet the needs of these four sets of tracks, and a subway or bridge connection was also essential. It is therefore not surprising that the widening of the tracks is immediately followed by a period of station building. But now, station building is building on the platforms themselves, and the awning is an integral feature of the problem. Thus we find a whole range of similar and almost contemporary station buildings: Boxmoor, Cheddington and extensions to Leighton Buzzard in 1875, Castlethorpe, Roade and Wolverton in 1882, to name only the examples which are still obvious.

The design and constructional method adopted in these stations is one which at the moment has a special importance. In the first place each individual building is one of a series; in the second place by force of circumstances it makes use of a material (namely, cast iron) which is fabricated away from the site itself and delivered for erection in standardized pattern. These are, of course, the characteristic features of the prefabricated building, and it is therefore of some interest to follow their repercussions in more detail.

The platform buildings at Boxmoor erected in 1875 can be taken as typical. The line at this station is at high level and almost at the point of crossing the main London-Aylesbury road. The forecourt to the station is approached by inclined in and out access ways from the main road so that its level is lifted closer to the elevation of the line itself. In the triangle formed by the access roads stand the station master's house and four railway cottages facing the line, and opposite these is the entrance to the station—a square structure of domestic appearance. These generally were the railway buildings before 1875; but when the addition of the third and fourth lines gave rise to the need for increased passenger accommodation, this was provided at platform level on each of the three platforms (up, down and island) and approached by means of a subway. The accommodation on each of the three platforms is identical; the 29 steps from the subway give access directly into a general waiting space (an arrangement that was subsequently modified by reducing the waiting room area thus allowing a more adequate stairhead which was part of the platform space—plan on the facing page). The main waiting room block in addition to the general waiting room contains a separate ladies' waiting room and lavatory. The men's lavatory is built as a separate block, but is united to the main block by a continuous awning—the space between the two blocks forming a well-screened area of platform for passengers.

The general plan arrangement is based on a 10-ft. building width, and has a length of 14 regular 8-ft. bays. On the basis of this unit grid 6 by 6 timber posts are erected at 8-ft. centres. Above these posts are continuous timber members spanning laterally across both the building and the awning, but supported on the awning side by the standardized cast-iron brackets (which, as their projection is limited, can be readily applied to different platform widths). The roof of the awning and building is formed by purlins spanning between these lateral supports; by varying the depths of these purlins the roof which is covered in zinc can be sloped inwards to a continuous box gutter; the eaves project well over the sides of the building and are finished with a deeper and fretted valance. Below this continuous valance the regular bay spacing gives a sense of order to the walling which consists of weather-boarded panels in which standardized 8-ft. doors and windows are set on the centre line.

Throughout the buildings the constructional and design problems are exceptionally well integrated. The description of these buildings on the plans as *waiting sheds* is the only relic of that separation of building and platform cover that characterises early station building. There is no longer in this example any trace of the hybrid forms to be seen at Pangbourne. Boxmoor and its type are completely conceived station buildings in which roof and awning read as a single plane embracing in their breadth the building units below.

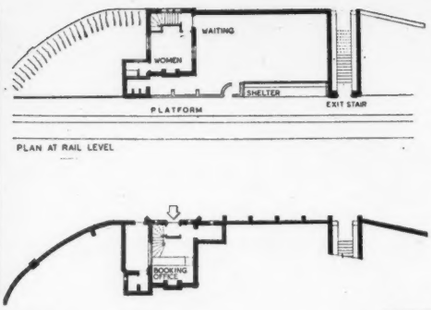
The design and proportions of the building which has been described are based on a very rigid standardization of dimensions; it is therefore interesting to find that the system is just as successfully applied at Cheddington (1875), where the main building block (including booking office and waiting rooms) occupies a triangular site between the main line and the Aylesbury Branch. Castlethorpe, Roade and Wolverton built seven years later (1882) still employ the same principles and the same cast-iron bracket supports, with the interesting variation that a 6-ft. 8-in. centre to centre spacing replaces the original 8 ft. and a larger window area is introduced.

Other intermediate stations on the same line (King's Langley and Berkhamsted, for example, built in 1883), whilst retaining the bracket supports, employ more permanent brickwork for the general walling and introduce the cast-iron column for all free-standing supports. The spacing of these supports is increased considerably over and above the free-standing wood posts at Boxmoor by the use of the brackets above the columns in a longitudinal as well as latitudinal direction, so that they reach out in four directions from the column cap. In contrast to the austere classicism of Boxmoor, Berkhamsted (the adjoining station) has a slightly Gothic Revival flavour. Perhaps this is an intentional effect, achieved in deference to the adjacent castle (or perhaps even the Gothic Revival Town Hall), or perhaps this, on the other hand, is inseparable from the use of arched windows with their coloured brick reveals and arches and a lofty entrance hall with a pitch pine roof. But in spite of its trappings the station at Berkhamsted remains a distinguished and considered piece of work in which the general planning could hardly be improved, where materials are tastefully employed (as for instance in the use of buff brick walls and white glazed brick window surrounds), and where the detail (as in the staircase handrail in the left-hand illustration above) is of a quality well above average.

In contrast to these examples there is on the old Midland line the characteristic pitched roof type of awning as at Chapel-en-le-Frith below, which so easily lends itself to Gothic revival treatment. There is also the completely different conception of unit construction on the old Lancashire and Yorkshire and in contrast to this nothing could be more noteworthy than the charming umbrella of iron and glass at Ulverston.

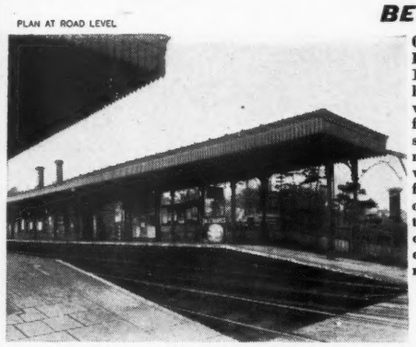
It will be seen that at this date at least the introduction of standardization and of the new materials in no way invalidates the quality and even the variety of station design. The standardized parts were, on the contrary, a means of introducing a new found order into a romanticism which could, and did, degenerate elsewhere into frippery ornamentation. So long as the ordered appropriateness of the new standardization could invigorate and sustain the romanticism by which it was enriched there was every promise of an architecture of balance and of variety. Though to some extent this balance was achieved on the railways more consistently than in building generally the economic forces behind these developments in building as a whole were too difficult to control. Without a powerful balance of taste, Ruskin's vision of a drab and dreary monotony overspreading the countryside could become only too true. The developed methods of transport could spread red bricks from Lancashire to North Wales and purple slates from North Wales to Cumberland. They did.

J. L. MARTIN



PLAN AT RAIL LEVEL

PLAN AT ROAD LEVEL



BERKHAMSTED

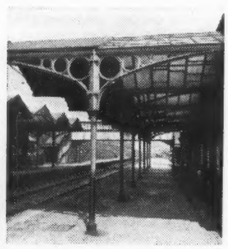
On the left are two illustrations of Berkhamsted Station, built in 1883. It is a combination of solid brick building in buff and white, with cast-iron columns and brackets for all free-standing supports. The spacing between the supports is much greater than between the wood posts at Boxmoor on the facing page. Above are plans of old Berkhamsted Station, showing the entrance through the booking office at the lower level and the extremely narrow staircase connecting with the platforms above.

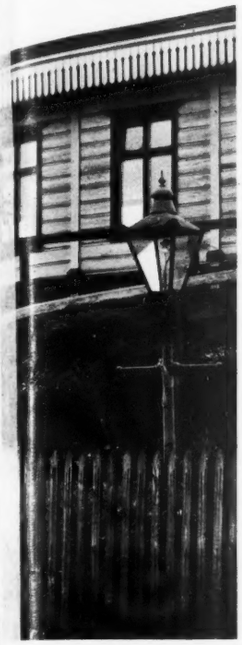
AWNINGS

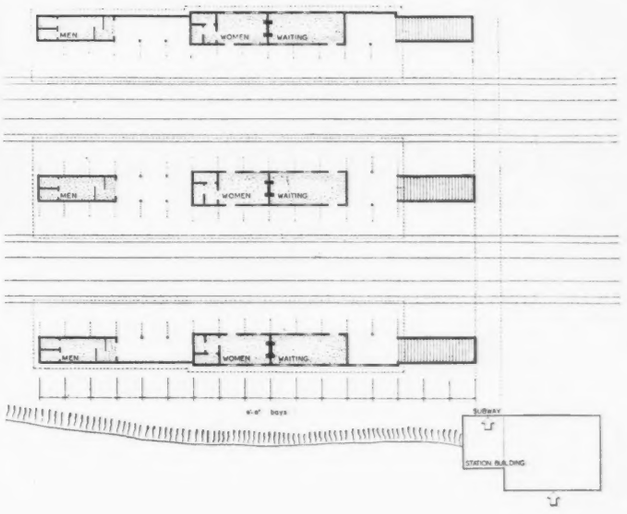
BIRMINGHAM

PANGBOURNE

CHAPEL-EN-LE-FRITH

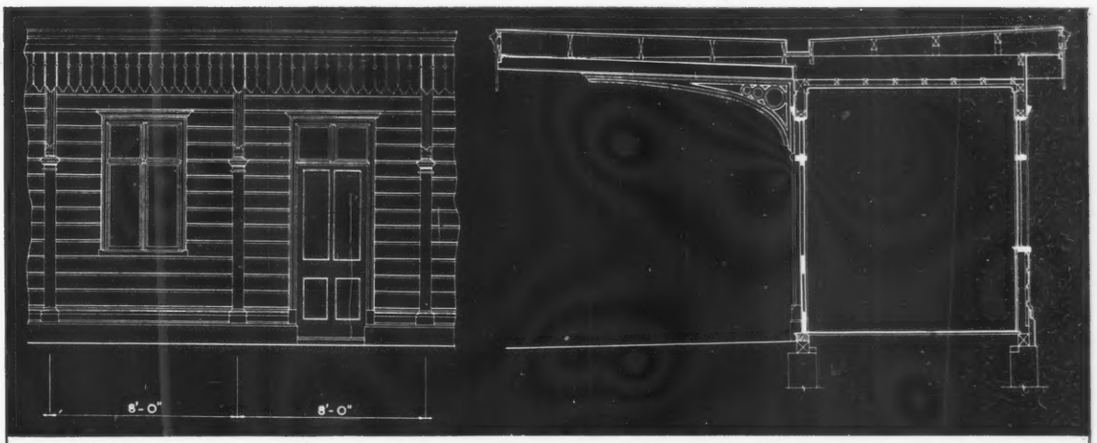






BOXMOOR

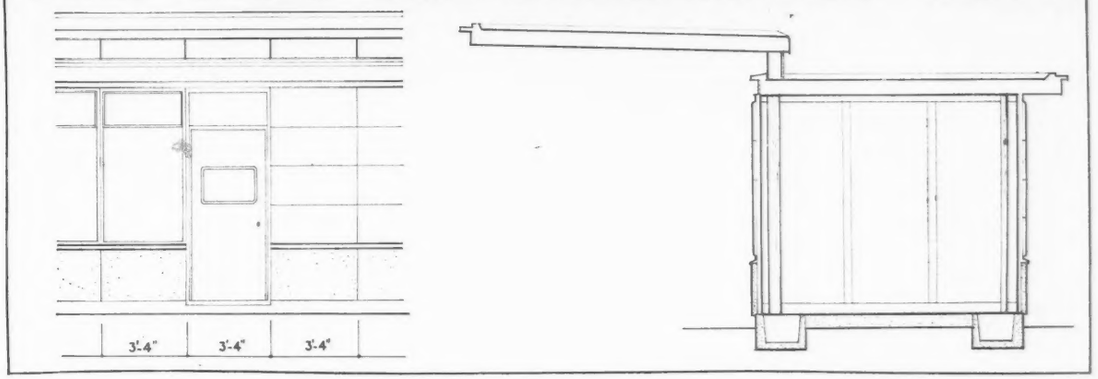
Above and on the left are illustrations of Boxmoor Station, built in 1875, and on the right, a plan as it exists to-day. The plan is based on a 10 ft. building width, and has fourteen regular 8 ft. bays. As is shown in the section and elevation immediately below, Boxmoor is an example of the completely conceived station building in which the roof and awning read as a single plane embracing the various units of the plan.



PART TWO

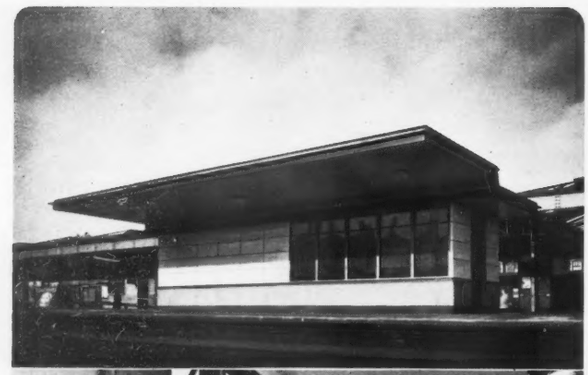
THE LMS EXPERIMENTAL UNIT

The problem that confronts the designer of the smaller station remains in essence very much what it was at the end of the nineteenth century. Technically, of course, the problem has become immensely complicated by the accumulation of new knowledge and of new methods. How far this process has taken place may be judged from the following description of an experimental station building recently designed in the office of William H. Hamlyn, architect to the LMS Railway Company.



The technical solution to the modern station must in the first place attempt to meet new requirements which are now proved to be desirable. One of these is flexibility of construction so that buildings can be easily extended or modified to meet changing conditions. A second requirement is maximum speed of erection: a third is special quality of finish and construction which will withstand the particularly arduous conditions of atmosphere and vibration but which at the same time will cut down maintenance to a minimum—in fact the most satisfactory finish would be one in which a smart appearance could be obtained by simple cleaning and any damage could be remedied by the use of spare parts held ready in stock.

These problems are not easily solved. Solidly built traditional stations, such as Berkhamsted, meet the requirement of robustness but often outlive the planning needs of a particular period: timber stations such as Boxmoor are flexible and easily adapted or altered



Top, the experimental building at Queen's Park Station. Centre, the waiting room and, bottom, details of the wall surface and entrance to the waiting room.

THE LMS ARCHITECT'S OFFICE

but extremely costly to maintain. The various requirements, taken together, need new materials and new methods. In order to find a satisfactory solution the LMS Railway approached the subject through the medium of its Building Research Committee, under the chairmanship of Sir Alfred Egerton. On this committee were scientific, engineering and medical representatives. The architect members were W. H. Hamlyn, J. L. Martin, and R. Llewelyn Davies; the latter also acted as secretary to the committee, co-ordinating the development work and being responsible for the preparation of the detailed drawings in the architect's office. The value of the committee work rested in the close collaboration of specialists: the engineering representative, for example, being responsible for all calculations in connection with the steelwork and awning construction and the research manager covering valuable tests on strength, insulation, weathering, corrosion, etc. The committee decided that a full-scale test model would be needed in order to carry out satisfactorily many of the tests and particularly the study of erection. As a result of this a building containing the main elements of a station has been erected at Queens Park and is here described.

The use of some form of unit construction was clearly indicated from the start. This entailed a study of the most satisfactory dimensional grid that could be easily related to doors, windows, the sizes of rooms and of manufactured materials. It is interesting to note that a unit of 3ft. 4in. was finally selected: a unit which has since proved to have exact relationship to the 6ft. 8in. grid finally used in the series of early timber stations built in 1882. This 3ft. 4in. grid controls all plan dimensions and correct spacing is in fact maintained by fixing holes formed in the outer curb of a duct which runs continuously round the building. After excavation, the laying of this duct is the first site operation. It is formed of pre-cast concrete U-shaped units and accommodates the hot and cold water supply, heating mains and drains. The external curb of the duct forms a level bed for walling units and its internal curb governs the floor level.

This operation is followed by the erection of the main steel framework. It will be seen from the illustrations that the main sectional outline is not unlike that of the early stations. The old station of the Boxmoor type utilises 6in. × 6in. posts in the front and back walls of the building supporting a continuous beam that projects forward to form the cantilevered awning—the cantilever being reinforced by the cast-iron bracket. The experimental model station at Queens Park replaces the timber and cast-iron by welded steelwork. A 6in. diameter steel column carries the main load: supported on this is a balanced and cranked beam—one arm of the beam forming the cantilever over the platform with its height fixed by the structure gauge; the other arm spanning the building, its height being governed by the ceiling height of the rooms. Any unbalanced load such as might occur with a greater awning projection is taken care of by a 3in. diameter column at the opposite side of the structure. The beams are formed by pairs of 7 × 2⅛in. steel channels spaced 8in. apart. The difference between awning and building height allows two levels of roof with a space for clerestory lighting between. These main supports and cranked beams are spaced at 16ft. 8in. centres. The awning and the roof of the building are formed by stressed-skin plywood boxes which span between each pair of beams and automatically form a flush ceiling to both awning and building.

The steelwork can be rapidly bolted together on the site and the plywood boxes are easily fixed into position and waterproofed. As the floor ducts and site concrete are already laid, there is at this stage continuous floor and ceiling fixing for all walling. The walls themselves are formed of units attached to wall posts spaced at the 3ft. 4in. grid centres fixed by the curb. The posts are formed of two steel box channels welded back to back, occupying a space of only 2in. × 2in. on plan and giving both the necessary strength and fixing possibilities. On to these posts external and separate internal wall linings are clipped into position by special clips with a lock nut that allows screwing without holding from the back and which cannot work loose from vibration.

The external facing of stations is not very satisfactorily solved by any of the traditional materials. Below cill level it is liable to heavy damage from barrows: above this level the primary need is for a non-absorbent, easily cleaned and attractively coloured surface. Thus the external facing calls for two types of treatment which are met in the experimental building by pre-cast concrete units with a granite face below cill and vitreous enamelled panels of a light blue colour above it. The architect to the Company had many years previously successfully experimented with enamelled iron as a facing for station building and its use as a material had been entirely justified in practice. In the experimental station a specially designed tray form of panel with an upstand along the top edge to act as a weathering allows concealed fixing and the use of dowels ensures vertical alignment.

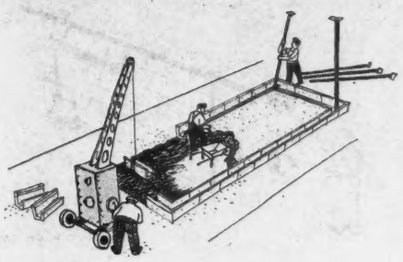
These two types of external facing are clipped back to the wall posts, being cushioned by a strip of polyvinyl chloride. Two lines of extruded bronze trim act as weatherings between concrete and enamelled iron and between enamelled iron and the awning soffit. The windows and external door frames (also in extruded bronze) have special sections that reduce dirt collecting ledges and provide a finished face that is flush with the wall surface. All joints are sealed with various types of mastic that are at present under test.

The design of the internal wall finishings has been determined by requirements of thermal insulation and flexibility in plan. The type of wall lining finally chosen consists of a panel built up of metal-faced plywood sheets on a timber frame, attached to the wall posts at top and bottom by special straps and brackets, and backed with a glass silk quilt. Fixings are concealed by skirting and cornice trim, and the wall posts themselves by a cover strip. By leaving out this cover strip at any point in the grid, partition units built up in the same way as the linings, and attached only to floor, and ceiling, can be taken off across the building, and provide a completely flexible means of dividing the interior. Internal doors are framed up in a single partition unit, interchangeable with any other.

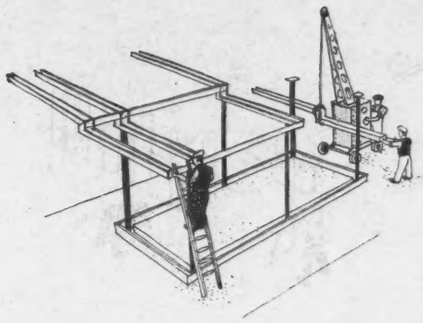
A complete central heating service is provided, consisting of a gas-fired boiler serving flush panel radiators from a ring main which runs in the duct. A single horizontal cast iron drain pipe, also in the duct, takes all the drainage, so that only one external manhole is required. The duct has removable cast iron covers over its entire length, enabling the piping to be inspected at any point; these covers are filled with the flooring material, in this case a chocolate coloured quarry tile, and the whole floor presents a flush finished surface.

The building was erected by a team of three skilled carpenters and one labourer, with specialist labour for steelwork and heating. The Building Research Station undertook a complete time study of the work, from which it emerges that the building is very economical in erection, comparing favourably with standard methods hitherto employed. Further investigations are still to take place to test fuel efficiency, comfort conditions, and so on, and, in particular, the weathering and amount of cleaning necessary to maintain the external surface.

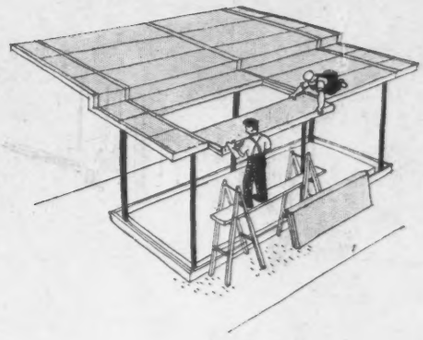
progress drawings



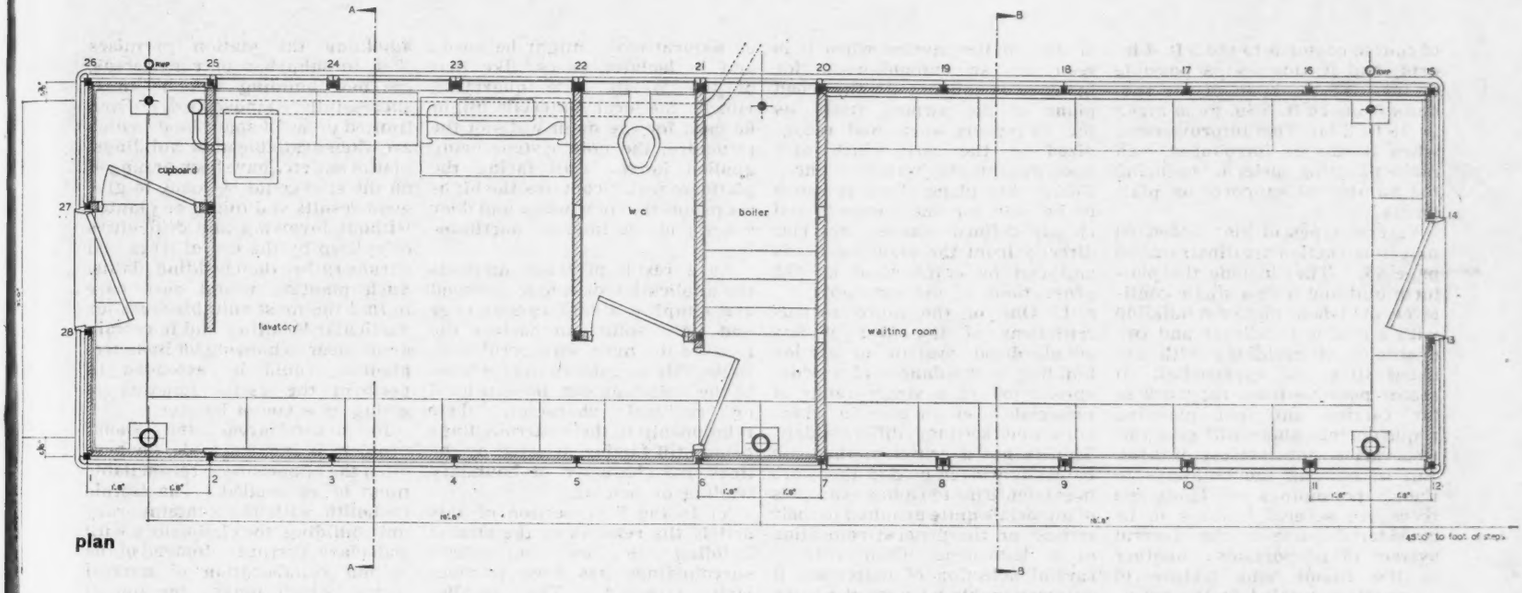
stage 1: Excavation and preparation. Placing of precast foundation blocks and site concreting. Erection of six main columns.



stage 2: Erection of cranked cantilever roof beams.



stage 3: Plywood roof units slide into position.



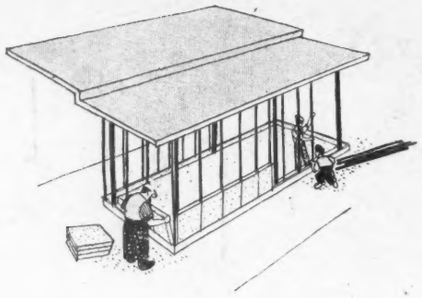
plan

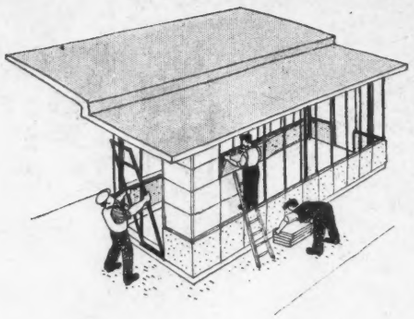
PART THREE

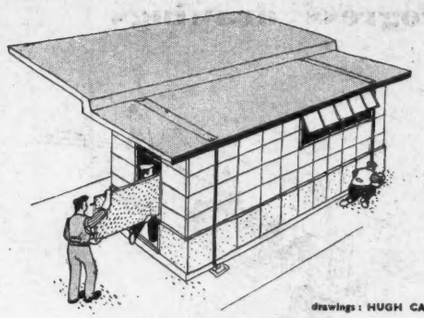
THE UNIT IN USE

There is no doubt that technically the problem of the unit station can be solved with a high degree of efficiency. But in addition to the technical solution there still remains the problem of applying it to a range of buildings with varying plan requirements and of relating these buildings to their rural or urban surroundings. With regard to the first of these problems, the system which has been described has now been applied to a number of different sites and has shown itself readily adaptable to them.

The system of roof construction, which in the experimental unit illustrates only the single cantilever, lends itself well to extension as a double cantilever for island platform buildings or as a straightforward system of roofing without any awning projection. Various widths of building and platform can be roofed without difficulty (though the building width must







drawings: HUGH CASSON

stage 4: Steel-frame wall-posts erected. Concrete dado blocks and plinth mould inserted.

stage 5: Enamel wall-panels fitted. Door and window frames.

stage 6: Internal plywood unit partitions, R.W.P.s, glazing, decorating, etc.

of course conform to the 3 ft. 4 in. grid) and it now seems possible to increase the span of the roof units from 16 ft. 8 in. to as much as 26 ft. 8 in. This improvement, when it can be introduced, will make planning easier by reducing the number of supports on platforms.

Several types of plan based on unit construction are illustrated on page 83. They include the platform building with a single cantilever, the island platform building with a double cantilever and two examples of buildings with unusual sites and approaches. It seems possible from the work so far carried out that planning requirements alone will give rise to a variety and interest of form. But in relating the buildings to their surroundings and landscape there are several features to be considered: one is the general system of proportions; another is the colour and texture of materials; a third is the possibility of using planting or existing buildings in the vicinity to achieve an interesting visual solution. For the sake of clarity it may be better to discuss these matters individually under separate heads:—

(a) A system of proportions is by no means inherent in a structural system. It is something which any designer either consciously or unconsciously works for. The system behind the experimental station building is one which differs sharply from that of the majority of prefabricated structures. These in the main, since they so frequently employ a floor to ceiling sheet cladding, are characterized by a vertical divisioning of the wall surface. The unit station on the contrary avoids this and its main effect of solidity is emphasized by the slightly squat proportions of doors, windows and wall panels. This squatness of proportion has two main advantages. It enables buildings of limited length to be erected with an effect of stability and solidity unobtainable in the vertically divided structure. It also relates in a very satisfactory way the main building to the long general lines of platform and awning. The main feature of the smaller station when it is seen on an embankment, for instance, is undoubtedly the broad plane of the awning itself (as the Victorians knew and recognized by the care which they bestowed on its fretted valance.) Below this plane there is much to be said for the compact and clearly defined masses that rise directly from the planning needs and can be emphasized by the proportions of the structure.

(b) One of the more serious criticisms of the idea of any standardized system of station building is the danger of a widespread use of a single range of materials over an area in which sites and settings differ widely. This is not a criticism that can be easily waived aside; there are in existence far too many examples of materials quite unsuited to their setting or the general coloration of a landscape. Even with a careful selection of materials, it is questionable whether the same finishes could be used as well for a station on the sea front at North Wales, as for one in the Cumberland hills, or in the suburbs of an industrial town.

The unit system is flexible enough to allow variety in dealing with these various types of site. By separating out the elements of support and screen it allows the supporting system to be consistently applied and the screening elements to be varied. This consistent awning treatment (which we have seen to be a major feature of the station building) is sufficient to give a unity of character to stations. The range of treatment in the screening element can be obtained by applying different types of facing material to the unit wall system. The materials used in the experiment (precast concrete in the base and enamelled iron above) were selected particularly for the suburban site or the site where the conditions of atmospheric pollution are severe. The enamelled iron facing can be provided in any desirable colour and the colour itself is permanent. There is no doubt that the majority of station buildings will call for this type of treatment. But in other cases infillings of timber, tile or natural stone might be used; and in isolated cases, like that of the Welsh slate quarrying village, the local materials might be used for the main walls of the structure, the unit system being applied in the wall facing the platform which contains the highest proportion of window and door space and the internal partitioning.

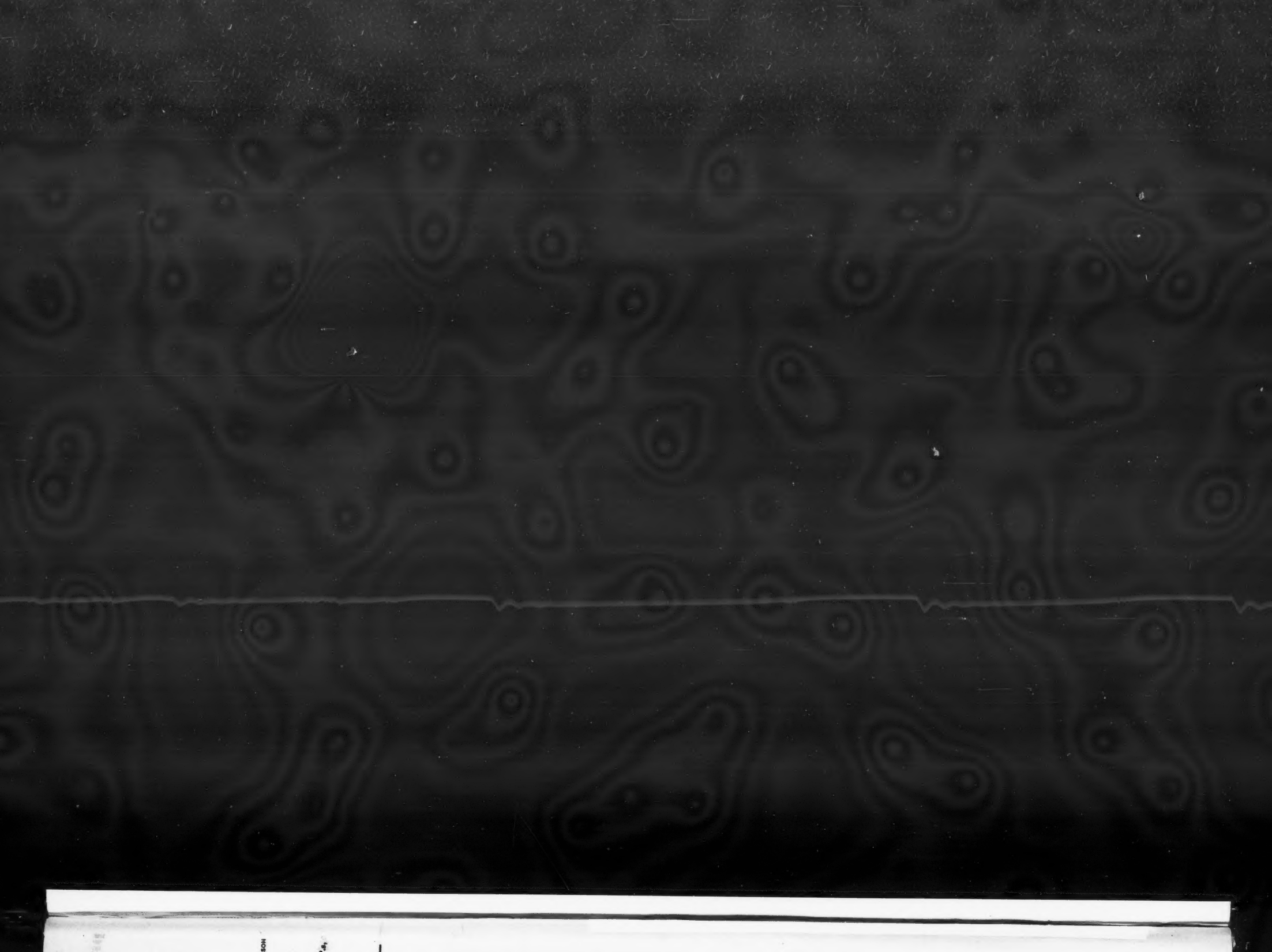
As a result of these methods the application of colour is broad and simple: a dark canopy edge and light soffit emphasizes the form of the main structural unit. Below this the colours and textures of the buildings can have a local or regional character, their relationship to their surroundings being still further assisted by the lines and character of boundary walling or fencing.

(c) In the first section of this article the relation of the station building to its immediate surroundings has been particularly stressed. The smaller station of the past was surrounded by a trim and well-tended garden and by generous planting; by such means, in addition to the romantic flavour of its architecture, the station was made to fit snugly into the landscape. Perhaps there is no better example of this than the small Welsh station illustrated in 1852 by Williams in his book "Our Iron Roads," in which the waiting space for passengers is no more than an arbour constructed of semicircular ribs over which the natural vegetation appears to be entwined. In the new station of Berkhamsted, built in 1883, areas of platform arranged for gardening are clearly shown on the sketch plans; but even when such opportunities were not provided, the adjoining top of an embankment or the side of a cutting gave scope for the spare-time activities of the railway staff. Even to this day the tradition continues and there are stations grimed by the London atmosphere that are enlivened annually by a fine array of hollyhocks.

This aspect of the station tradition is one that we can ill afford to forget; in fact it is by the judicious use of planting on land adjoining the station premises that, in suburban or rural areas, the new building can be most successfully landscaped. Even limited areas of spare land (which are often available after buildings, platforms, etc., have been arranged on the site) could be made to give good results and might be planted without involving any difficulties of upkeep by the use of trees and shrubs rather than bedding plants. Such planting would need care to find the most suitable trees for particular localities and in certain areas (near to housing for instance) planting could be extended to perform the useful function of acting as a sound barrier.

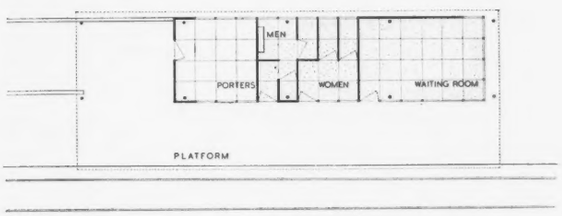
In urban areas the visual problem is less tractable, for here often the apparently irreconcilable must be reconciled. The Gothic monolith with the contemporary unit-building, the chain store with Balaclava Terrace. Instead of the helpful collaboration of natural forms, which makes the job of the designer so much easier in the country or suburbs, the initiative in the town is almost entirely on the designer; indeed, too often his struggle for a successful visual solution turns into a fight against what he conceives to be active opposition from the past. This is unfortunate because if finance, function or sometimes even sentiment demands the retention of the Gothic Town Hall, the Italianate Fire Station or the Regency Terrace, he has, in the majority of instances, been granted a staunch ally.

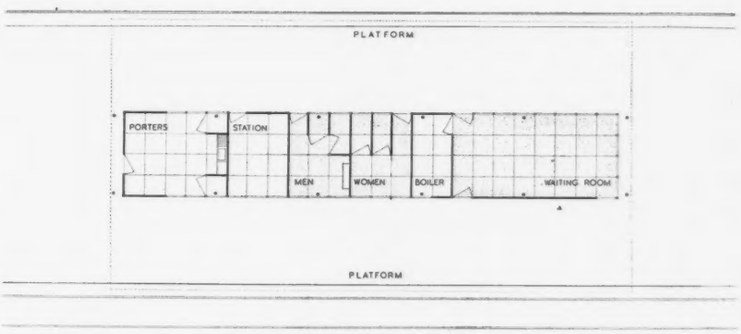
The interest, both visual and historical, provided not only by the cool, esoteric beauties but as well by the full-blooded extravagances of other ages, in contrast to the aesthetics of our own austere, if commendably social, one is something not to be dismissed too lightly. Often it does as much for the new urban building as superb existing planting does for the rural; in a few cases it may do even more, for trees and plants have but to be planted and properly tended to grow and at length provide the desired setting, but a building of beauty, originality or of curiosity is unique in time and space. J. L. MARTIN

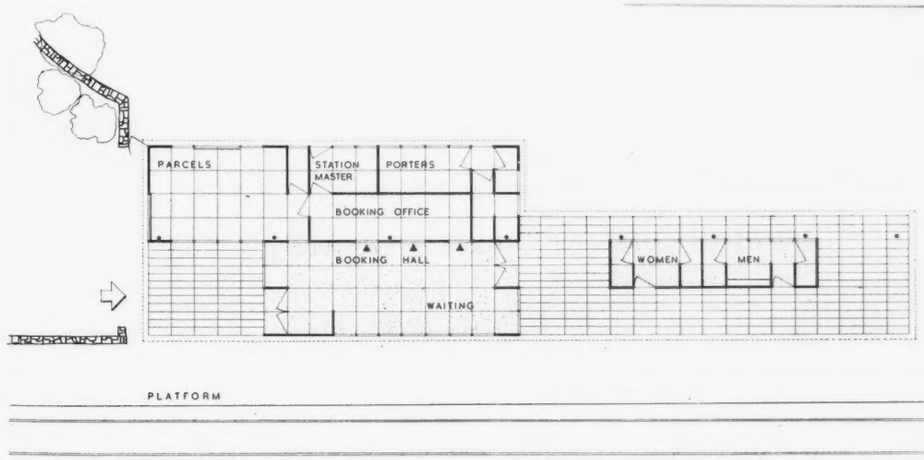


THE UNIT IN USE

Above is an expanded perspective showing what the LMS experimental unit system will look like when applied to a specific problem of station planning. It illustrates how the careful use of local materials can give added interest to the design and, at the same time, can help to express regional character.





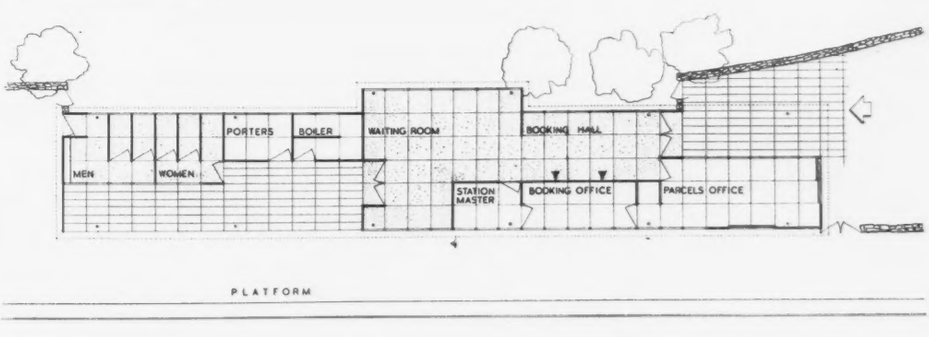


SINGLE AND DOUBLE CANTILEVER

Above is a plan for an island platform building with double cantilever awning; accommodation is provided for porters and station-master and for the passengers there are lavatories and a general waiting room. Above, left, is a plan for a simpler platform building, without separate accommodation for the station-master.

PLANS FOR SPECIAL SITES

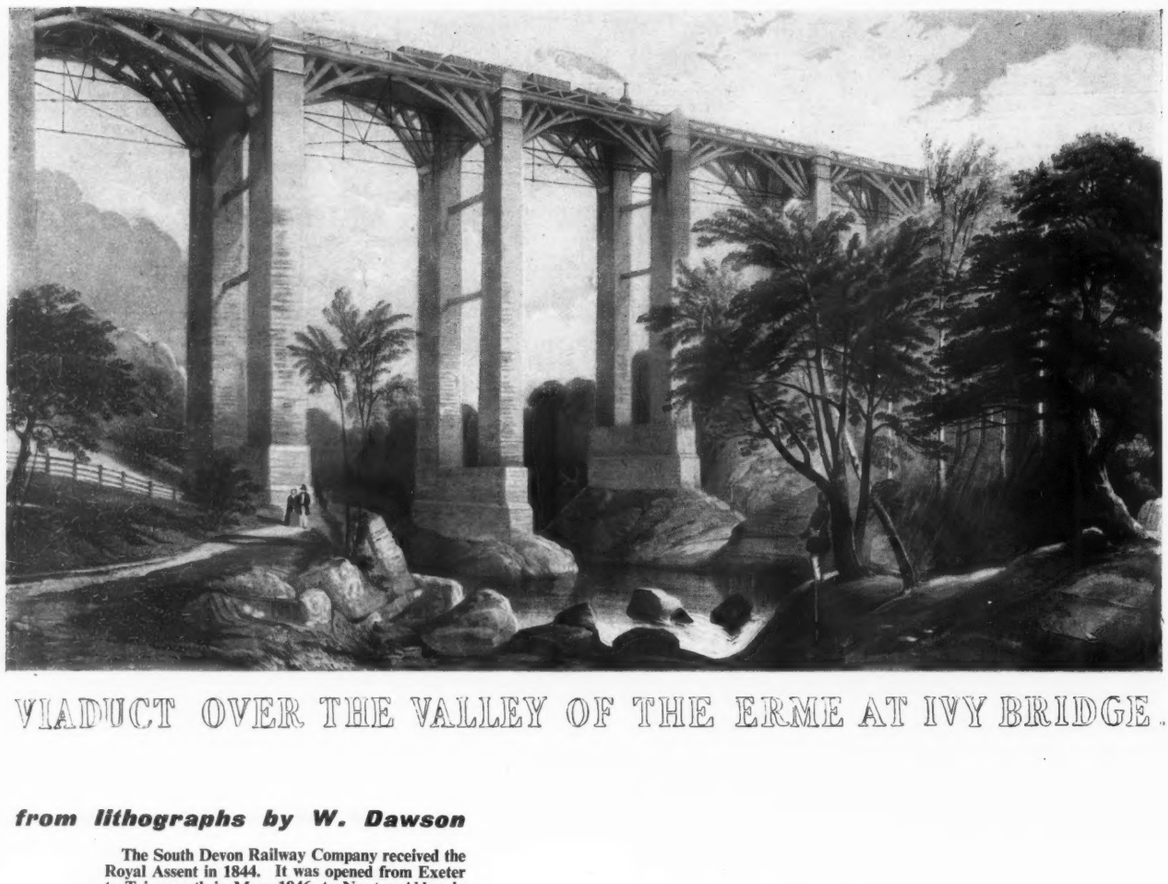
Above and on the right are plans for station buildings on special sites. Here the requirements are rather more complex, and provision is made for parcels office, booking hall and booking office.



appendix

THE FUNCTIONALIST SHARAWAG

1848



VIADUCT OVER THE VALLEY OF THE ERME AT IVY BRIDGE.

from lithographs by W. Dawson

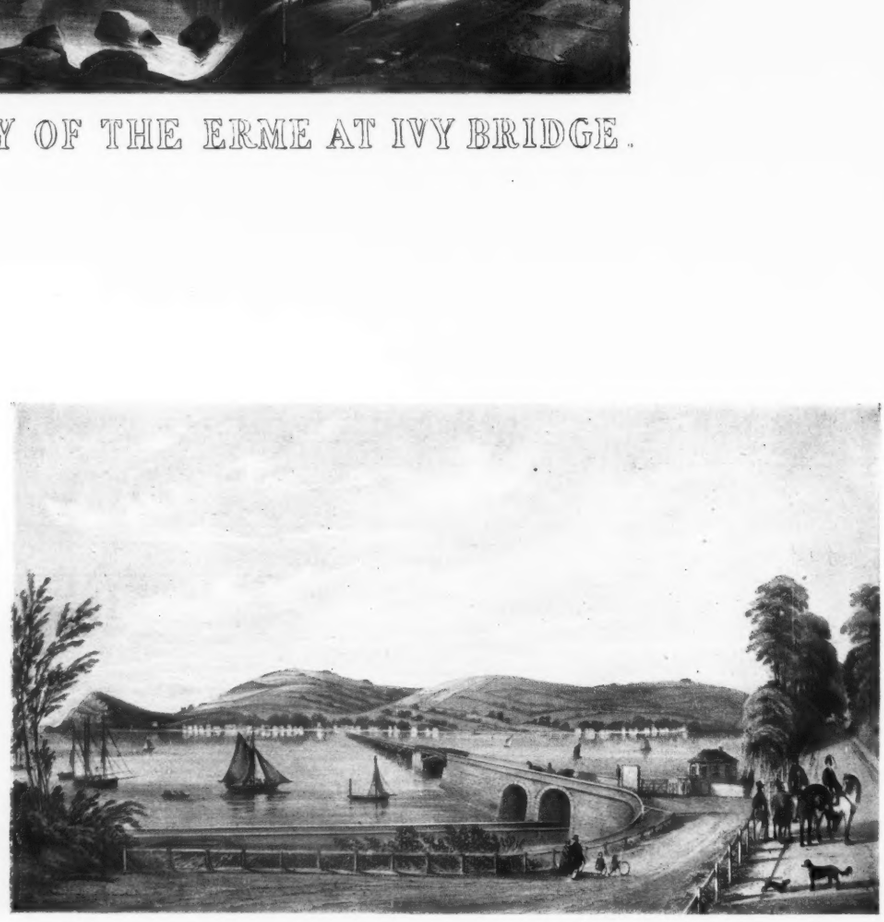
The South Devon Railway Company received the Royal Assent in 1844. It was opened from Exeter to Teignmouth in May, 1846, to Newton Abbas in December, 1846, to Totnes in July, 1847, to a few miles from Plymouth in May, 1848, to Torquay in December, 1848, and into Plymouth in 1849.

It is thus not one of the very earliest railways, but early enough for the thrill of railway travelling not to have been worn off yet. For us it is hard to imagine the sensations of those to whom a journey was "a series of enchantments surpassing any of the Arabian Nights" and the traversing of a tunnel a cause for shudders and thoughts of destruction (*see* J. M. Richards: THE ARCHITECTURAL REVIEW, vol. 91, 1942).

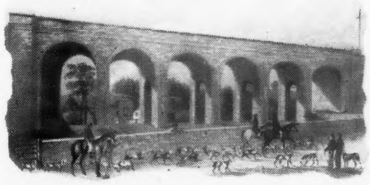
Much less seems to be recorded of contemporary reactions to the new engineering structures changing between the 'thirties and the 'seventies the landscape of Britain. Yet comments on them would be specially interesting, because, while the railway journey has lost much of its fearsome fascination, viaducts, bridges and tunnel openings still possess all their romantic connotation of the sublime and the picturesque.

Our language in describing the Erme Valley Viaduct at Ivy Bridge (top picture) would still be that of the old Murray Guide: "The River Erme . . . is at times a wild impetuous stream, which leaves its bed of granite, and carries the wrack of the moor over the neighbouring fields. It . . . flows through a romantic solitary glen, filled with old woods and rocks (where it is) spanned by a viaduct, a spider-like fabric of such slender proportions that one wonders it has not long since been blown away into the moor. It resembles at a distance a line of tall chimneys, and consists of a black wooden roadway, which is carried in a curve over ten pairs of white granite pillars, each pair being 60 ft. apart, and the most elevated 115 ft. above the valley."

Yet there is something else in this that we feel more strongly to-day. The usual thing to create



LINE OF THE RAILWAY ON THE LEFT BANK OF THE TEIGN AT SHALDON BRIDGE.



sharawaggi is to place picturesque chunks into a plain scene. Here plain chunks are placed most boldly into a picturesque scene. The effects are worth recording, especially as we shall have to do a lot of it in this century of ours, in the shape of power houses, pylons, cooling towers, gas holders and so on.

The massive granite piers and the elementary, cyclopic timber trusses are of the same nature as the individual boulders on which they stand. Terribilità of nature is continued into terribilità of architecture. But this is not the only mood of which the engineers were capable. The Slade Viaduct (at the foot of this page) is in quite a different key. If the scenery at Ivy Bridge was picturesque in the Salvator-Payne Knight way, the scenery here, only a few miles from Ivy Bridge, is all Lorraine-Capability Brown, smooth and arcadian. In it the railway structure appears with all the contrast, piquancy, incongruity that the sharawag can wish for. Maybe that the effects of both the Erme and the Slade Viaducts are accidental—but that matters little. They remain just as much an object lesson as if they were consciously dressed. Artists have known that since Leonardo da Vinci.

And Mr. W. Dawson must have felt it too, in his own way, when in 1848 he drew the series of water-colours from which these lithographs were made. Look at yet another viaduct, the Morley Viaduct (heading this column) and what the lithograph makes of it. A solid mass of masonry at the back, Colosseum-like and surprisingly successful as a contrast to the traditional hunting scene in front.

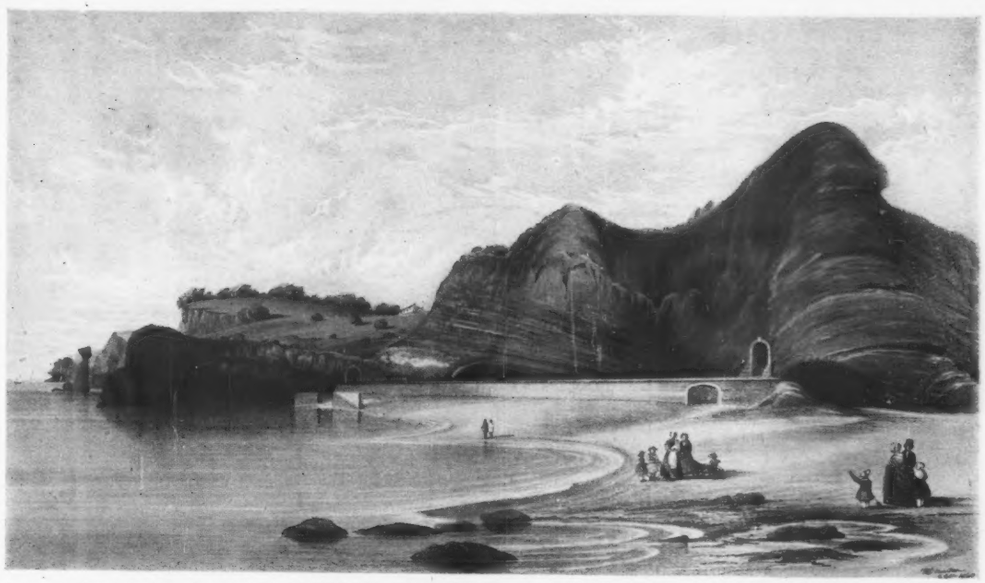
Or take Shaldon Bridge (previous page) where the railway runs as a smooth band through the picture, neatly parallel to the picture plane, disappearing under the near end of the bridge (with its 1,671 ft. said to be the longest in England), which sweeps over it with a very Bauhaus curve, then carries the eye gently across the estuary to Shaldon.

On the other hand the stretch of railway between Dawlish Sands and Hole Head (top right) affords a scene of contrast. Wild blood-red rocks and the tunnel openings evocative of gloom and reverberating thunder—but in the foreground the sands of Dawlish —"a small but fashionable watering-place," says Murray, "picturesque, well laid out, and with peculiar features." Peculiar, we might add, mainly for the new spirit of romantic functionalism, to be observed in the superb line of the railway embankment, and the size and placing of the tunnel openings, setting off an already dramatic scene to perfection.

Finally Langstone Cliffs, also close to Dawlish. The railway here passes the Warren ("used for rifle practice," according to Murray; and Mr. Dawson bears him out). Exmouth lies over the other side, flattened out white toy-box houses, and the railway track once more sweeping right across the centre of the scene, but this time deepening with the gradual contour of the land until it disappears into the rock alongside a superb piece of natural sculpture.

It is hardly possible to attribute effects such as these entirely to accident. What is more likely is that the approach of the engineer to the visual problem was largely unconscious. Although it is hard to believe this to-day, there are other examples to show that a century ago a few men did combine the gift of a well-trained eye with all-round engineering genius. The fact is, each of them bridged two ages—and that in a single span. This makes their achievements almost incredible to us who, after a century's slavery to the machine, possess only the ruins of the bridge and have to rebuild it, consciously, brick by brick.

Such examples as these therefore, are, to the contemporary architect or town planner, in the nature of revealed truths; they came to other people more easily through some circumstances or situation of their time, but to-day after a century of visual-technical divorce we have to analyse and relearn them the hard way.

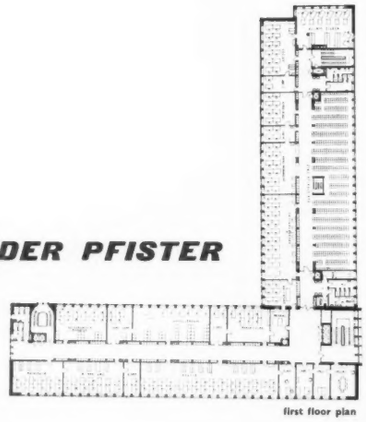


LINE OF THE SOUTH DEVON RAILWAY, FROM DAWLISH SANDS TO HOLE HEAD.

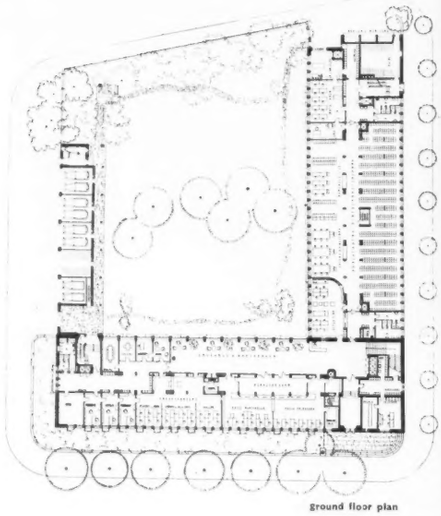
LINE OF THE RAILWAY, ACROSS THE WARREN AT LANGSTONE CLIFF.

THE SLADE VIADUCT.

GEBRÜDER PFISTER



first floor plan



ground floor plan

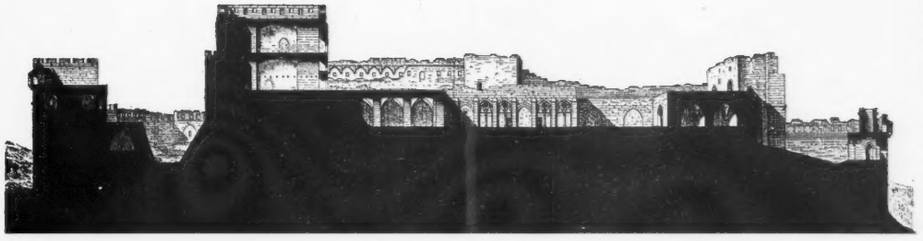
3

1

2

INSURANCE BUILDING AT ZURICH

The Swiss Life Insurance Company some twelve years ago found itself in need of new offices to house a staff of about 550. A public square was purchased from the City of Zurich lying behind the Arboretum and close to the Lake. The City was ready to sell because the intention had existed before to round off the City's skyline from the lake in that spot. One of the conditions of the transaction was that some of the old elm trees in the square had to be kept. A competition was held in 1933-34. The building was begun in 1937 and completed in 1940. The main facade, 1, is turned towards the lake, that is the east. What remains of the old square is now a garden behind this main block. The building is six storeys high. The main entrance is placed asymmetrically and faces the lake. On the ground floor towards the west garden is a wide hall, 2, completely glazed to keep the view open on to the garden. The first to fourth floors are mainly offices arranged on both sides of a spinal corridor. On the fifth floor are the directors' offices with a long balcony in front facing the lake. The north block houses chiefly the filing departments—an enormous item in an insurance building. The clerks work on the south sides, the files are on the north. There is a south wing too, kept one floor high so as not to interfere with the insolation of the main offices. Extension along the west side is considered for the future. The construction is reinforced concrete with concrete floors. Outer walls are faced grey Swiss lime-stone with darker granite bands. Inside staircases and floors are lime-stone, walls and ceilings are plastered. Panelling is natural oak, except in the directors' offices where also walnut and cherry are used—all native timbers. Of sculptural decoration the heraldic frieze by the north-east corner, 3, is the work of E. Keller and W. Bacher. Heating is entirely within the concrete floors—the system so eloquently advocated by Frank Lloyd Wright. Lighting is indirect everywhere and of daylight character. Communication between the floors is by nine lifts and twenty-six small lifts for files.



CRUSADER COUNTRY

The Crusader castles of Syria, monuments to the courage and fortitude of their builders, are remarkable not only for their immense bulk, but also for the skill of their masonry, their ingenious planning, and surprisingly for occasional great beauty of detail. The castles are separable, through their geographical position and function, into two main types, the mountain and the coastal castles, the most notable of which are described in the following article by ROBIN FEDDEN

THOUGH it is six and a half centuries since the last Crusaders embarked for Cyprus, the architectural imprint of the crusading enterprise remains heavy upon the Syrian littoral. Immense, and immensely solid, their castles couch on the mountain spurs, clawing the rock and the spare soil. They still dominate the passes that lead from the Muslim hinterland to what was for so long the Frankish seaboard. It is symbolic of the liberality with which the Latins undertook these fortress works that some can no longer be identified; no name mentioned in the crusader chronicles will fit, and we ignore who built them and when at last they fell into Saracen hands. Such anonymity is inevitable when castles sprang up fully armed, like the soldiers of the Jason legend, on almost every promontory and tell from Edessa to the Red Sea. From this multiplicity stand out in due and impressive prominence the greater castles, which constitute as a group the cream of mediæval military architecture. They are known by their names and deeds. No anonymity here. Beaufort, Safita, Sahyoun, Markab, Krak of the Knights: these and others are famous and embody half the history of the Latin kingdom.

The immense drive and determination of the Crusaders are brought home in sheer weight of stone; the repeated triumph of setting up these great land Leviathans, often in the most inaccessible places, still astounds. Yet it is not a matter of bulk alone. The castles impress equally in the skill of their masonry, the strategic cunning of their lay-out, and unexpectedly (in buildings of such severe purpose) by sudden beauty of detail. The lovely columns and capitals of the chapel doors at Markab, the Warden's Chamber at Krak with its ribbed vaulting and roses carved in stone, are an essential expression of the same building sense as produced the mammoth walls and the heavy bastions. Great strength and great delicacy; in fact the architectural genius of twelfth- and thirteenth-century France, but doubly impressive in such alien surroundings.

From the point of view both of geographical position and function, the castles are separable into two main types. There are on the one hand the mountain castles, set to control the passes through the Lebanon and the Gebel Alawi to the sea; and on the other the coastal castles whose duty was to watch the coast road and protect the ports against the Muslim fleet centred on Egypt. Dotted up the coast the maritime castles are not on the whole so large, so well preserved, or so impressively placed, as the mountain fortresses. Of their number, Tortosa is worth particular mention, both on account of its architectural beauty and for the insight which it seems to give into ecclesiastical and civil life in the Latin kingdom. The castle and the present town of Tartus lie northward from Tripoli, and the approach is across a lugubrious marshy plain where shepherds build their huts with reeds like birds and sluggish streams curl and twist their way out through saltings to the sea. It was at Tortosa that the Order of the Templars established their principal fortress. There in the great hall, nearly fifty yards long, hung their standards and the trophies of their battles, and there the Order met for counsel and deliberation. Separated from the castle and standing within its own wall there existed in crusader times the episcopal town, centring round the cathedral shrine of Our Lady of Tortosa. A considerable stretch of the town wall on the north and east, including the north gate, still stands, but it is the cathedral itself, preserved through a series of misadventures as storehouse, mosque, and garrison, that to-day creates the unique interest of Tortosa.

The town was from early times an important Christian sanctuary. Its church altar claimed the honour of being the first dedicated to the Virgin, and St. Peter was vaguely reputed to have there celebrated mass. The earthquake which at an early date destroyed the church, but by a miracle preserved the altar intact, only served to increase the prestige of the shrine. It was thus upon a site already revered that the Franks in the twelfth and thirteenth centuries erected the present cathedral. It soon acquired a tremendous reputation as a place of pilgrimage, and people from all over Europe came to pay homage to the Virgin of Tortosa. The exterior of the cathedral is a little heavy, almost squat in appearance, and was reinforced in the thirteenth century for purposes of defence. The effect of the interior is very different. On entering one finds a magnificent church of the transition period, reminiscent in style of buildings in Burgundy and Provence. To specify a nave carried on four arches, side-aisles, a triple apse, and a fine barrel roof, is to say nothing. It is the perfection of proportion that counts, the way in which the weight and solidity of this fortress church are translated into symmetry and grace. The effect is increased by the magnificent colours—a range of ambers marbled with verdigris—that the stone has taken on through time and a happy neglect. One realizes also after a moment that this is one of the few churches, not in a ruined state, that one has really been able to *see*. Custom dictates that architectural bodies must wear clothes. This one is utterly bare, pure masonry: not a lamp, not a pulpit, not a piece of plaster, not even the discreetly creeping electric wire. Here is a church naked, largely as the inspired masons left it, and the beauty of fine stone-work, essentially an architectural beauty, comes home to one with tremendous effect.

Castles are necessary for defence, but works such as the cathedral of Tortosa suggest a settled civilization, imply that the builders had come to stay, and so give one an added insight into the civil life of the Latin kingdom. One glimpses the laborious effort to establish a permanent culture and society that went on in the many quiet intervals between the alarms and excursions of two hundred years. The cathedral at Tortosa, though the greatest, is merely one of a number of ecclesiastical monuments—one might mention the mutilated cathedral of St. John at Beyrouth, and the delightful little church looking out to sea at Byblos with its elegant baptistery—which speak with far greater intensity and pathos of the ultimate failure of this endeavour than do the castles.

Of the great mountain fortresses, Beaufort, Markab, Sahyoun, and Krak, are all fairly accessible from the coast. Beaufort, a long sprawling ruin, hangs nearly a thousand feet above the Litani river, and the best view of it is from the other side of the gorge. The abyss acts like a sounding box and in the stillness every note from the castle precipices comes faithfully across. Before you have spotted them, you hear the rattle of the goats clambering on the scree below the castle walls and recognize the goat boy's whistle, that limpid non-human note common to all the Mediterranean shores. The castle belonged first to the lordship of Sayette, and later to the Templars, but in spite of the forbidding gorge fell to the arms of both Saladin and Beybars. It is said that during the first siege the Lord of Sayette, though he had received a safe conduct from the Saracens, was tortured in view of the castle walls in order to break the defenders' morale. Whether such an incident occurred or not, the story is typical of many others which thoroughly explode the legend that chivalrous relations were anything but an exception between Crusader and Saracen.

Markab lies north of Tortosa and its black basalt walls and towers dominate a curious country of white chalky ridges and turf-covered slopes. Standing on a spur two or three miles inland the castle combined the tactical position of a mountain fortress with the duty and possibility of watching the coast road. Its strength was such that Saladin even after his victory at Hattin dared not attack it, and for a hundred and fifty years it remained in Frankish hands. The finest parts of the fortifications were erected in the thirteenth century by the Hospitallers who had charge of the castle. The vast water cisterns which lie under the paved court, the chapel with its fine Gothic doorways, and finally the round keep, second in size only to that built at Coucy in Northern France a century later, are particularly impressive. From the summit of the keep, whence there is an amazing view over coast, sea, and mountains, the surprising size of the area girdled by the double castle walls becomes at once apparent. Upon these walls four knights and twenty-eight men-at-arms kept watch night and day, year in and year out; and within the walls whole villages with their livestock retired for shelter, and a five years' supply of provisions was comfortably housed.

TORTOSA : *interior of the Cathedral.*

BYBLOS : *the baptistery of the Latin Church.*

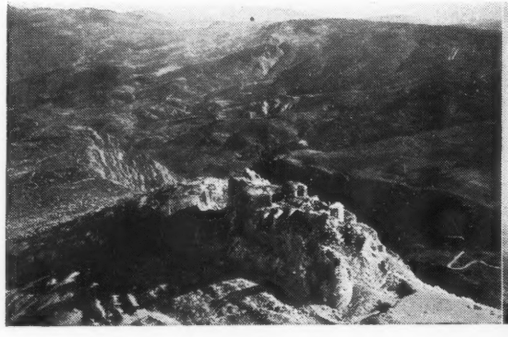
Sahyoun is within a couple of hours drive from Markab and lies in a wild landscape of boulders, evergreen shrubs, and tenacious dwarf oaks. The castle grasps a thin rocky ridge and is not naturally raised above the surrounding country in protective isolation as are most of the mountain fortresses. It is to this lack of natural fortification that we owe the most remarkable feature of Sahyoun—a tremendous channel, cut in solid rock, that separates the ridge on which the castle stands from the hillside behind. This extraordinary divide, whose towering sides are haunted by that decorative bird the black and scarlet wall creeper, was spanned by a drawbridge carried on an isolated pinnacle of rock whose hundred and ten feet still rise sheer from the bed of the hewn channel. There could be no more astonishing testimony to the energy and determination of the Franks. In spite of their labours the castle fell to Saladin in 1188 after a bare seventy years occupation and was never recaptured. Their loss was in a sense our gain, for almost alone among the great castles Sahyoun did not pass later into the hands of the military orders, those indefatigable building corporations, and thus remains a unique example of twelfth century crusader work, showing the modifications which the Franks first introduced into the fortresses they occupied.

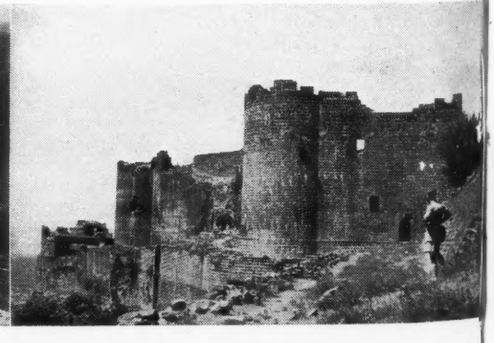
Krak, the most splendid and the most impressive of the crusader castles, guards the gap that divides the Lebanon from the Gebel Alawi. It is in almost moorland landscape that the great pile first comes into view perched on a spur of the foothills and overlooking a marshy snipe-frequented plain, the Boquée of the Crusaders. T. E. Lawrence thought Krak "perhaps the best preserved and most wholly admirable castle in the world." It is difficult not to agree. The solidity and the art which appear to be the salient features of crusader architecture are at Krak combined in supreme fashion. To stand on the south-west tower gives one the impression of being on the bridge of a ship, and the kestrels wheeling in the air scream as bitterly as gulls. The fortress buffets the wind and rides above the extended landscape with a ship's seeming-confidence and mastery. There is the same strength, together with the same beauty of design, and, as on a fine vessel, the precision of the scheme transcends the utilitarian and creates a work of art. The plan of the concentric walls, the disposition of the flanking towers, and the whole lay-out of the inner castle, are infinitely pleasing, and at the same time are contrived with the exactitude and economy of a naval architect's blueprint. But the analogy ultimately fails. In its immense solidity and weight the castle is pure mountain. Indeed the great slant wall that slopes outward beneath the southern towers, a wall *eighty* feet thick, was known to the astonished Muslims simply as "the Mountain."

This amazing creation stands, owing to the skill of its builders, time's leniency, and the meticulously faithful restoration of the French authorities, much as it did when the Crusaders left it. Thus it is one of the few mediæval castles that the amateur can not only "feel," but, owing to its full preservation, understand. Indeed the perfection of this preservation makes Krak seem incongruously empty, and its silence out of place. These halls and passages, essentially functional architecture of the best sort, ought somehow to be filled with the knights and sergeants for whom they were designed; the sound of mediæval French ought to reach one from the guard-room and the chanted Latin mass from the twelfth century chapel. For a century and a half without a break the Crusaders *were* within these walls—as many as two thousand men when the place was fully garrisoned. The Hospitallers received the castle from Raymond of Tripoli in 1142, and it was they who were responsible for remodelling it and creating the present fortress. Not long after the Order had taken over, Nur-ed-Din attempted the place and was roundly beaten under the walls. Saladin, twenty-five years later, marched on the castle, saw its strength and marched away again.

Inside, life went on from generation to generation, and with it the daily business, the policy and administration, involved in the maintenance of an important feudal fief. Meetings and banquets took place in the thirteenth century hall; great figures came and went; and one after another the Wardens of the Castle from their airy vaulted chamber in the north-west tower looked down on it all. Their names, such as Hughes Revel, Armant de Montbrun, typify the fundamentally French nature and composition of this curious monastic enterprise. The great pile fell at last to the Sultan Beybars in 1271. It was by that time a lonely bastion and the crusader tide had long since ebbed away from the inland country. Even so the Sultan, an exceptionally competent general who had started life as a Damascene slave, had to resort to an almost treacherous expedient to take "the Mountain" and the southern stronghold. A letter, which the defenders took to be genuine, was conveyed into the castle. It purported to come from the Count of Tripoli and instructed the garrison to surrender. Thus after a century and a half Krak capitulated; and the knights under safe-conduct rode away to the coast, leaving behind them this architectural monument to their long occupation.

Anyone who sees the crusader castles of Syria will inevitably ask himself two questions. Why, first, were they built in such numbers and on such a scale? Secondly what architectural influences were predominant in their construction? The first question is the easier to answer. The twelfth and thirteenth centuries in Western Europe inaugurated the golden age of military architecture, but that in itself is not sufficient to account for the fever of crusader building, for the great number and vast size of their castles. The latter were brought into being by a serious problem non-existent in the West—lack of manpower. The huge crusader army that originally crossed the Bosphorus had dwindled, it has been estimated, to a 100,000 by the time it reached Antioch. On the subsequent march south each fief and feudal principality, as it was created, drained off its complement of men, leaving an ever smaller force available for immediate concentration against the enemy. Of the original army perhaps not more than one in twenty reached Jerusalem. When that city fell and yet others sailed home, it is said that only five hundred knights remained in the southern province of the Latin kingdom. For every armed knight one must count ten, or perhaps more, foot soldiers, but it was only the knights who really counted in combat. They were the decisive element in all the battles of the time, and it was essentially the net superiority of the mounted Crusader over the Muslim horseman that made possible the capture of the Holy Land. However, when knights were numbered by scores, every casualty counted. The reinforcements that trickled in, younger sons, adventurers, pilgrim knights, were barely enough to make up losses. Thus when the first properly organized reinforcement—the Second Crusade—came to hopeless grief in Asia Minor in the middle of the twelfth





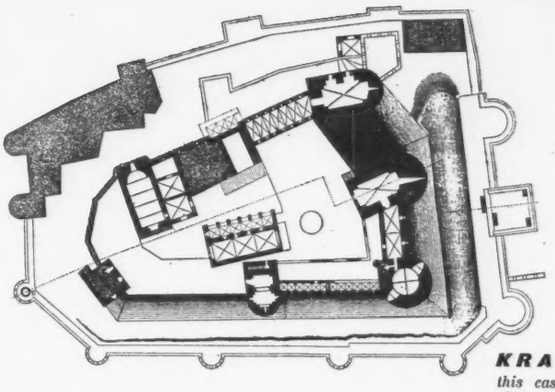
BEAUFORT AND MARKAB : *right, the ruins of Beaufort with the Gorge of Litani beyond. Extreme right, the walls of Markab; they are built of black basalt and dominate a countryside of white chalky ridges and turf-covered slopes.*

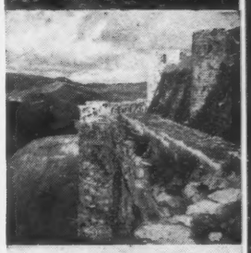
century, it was already evident that the inadequate force available could not hold the Latin kingdom without intensive fortification. Lack of crusader manpower necessitated the castles; local labour built them.

The problem of the architecture of the crusader castles is a more complicated, and a very specialized, one. Angels here tread the ground with considerable circumspection.* One theory, in extreme form, is that the Latins were initially pretty naive in these matters, but that after seeing the Byzantine castles of Asia Minor, and as a result of prolonged contact with the Byzantines they adopted the methods of fortification with which the Eastern Empire had been familiar since the time of Justinian; that they had in fact everything to learn and that the inspiration for their architecture came directly from Byzantium. Another theory, again expressed in its extreme form, is that the inspiration of crusading architecture came directly from France and Italy. Certainly neither of these extremes represents the truth, which probably lies somewhere between the two. Arab influence further complicates the problem, for Arab fortresses of Byzantine inspiration had gone up in Syria centuries prior to the Crusades, and Arabo-Byzantine contacts had resulted in the evolution of something very like indigenous Arab fortification.

One thing at any rate is certain: if the Franks came in ignorance, they proved remarkable pupils and, whether exploiting their own knowledge or the wisdom of Byzance, they rapidly evolved a military architecture more formidable than anything that had been seen before. This is not the place to go into the subject in detail, but a tentative summary of the main features of crusading architecture in relation to their Latin or Arabo-Byzantine origins is essential to an understanding of the Syrian castles.

The Sites. The Crusaders raised most of their major castles on natural defensive sites, which thus in some degree determined their shape, and which had often enough been used by the Byzantines and Arabs before them. In the latter instance existing fortifications were usually incorporated (Sahyoun is a good example of this).





KRAK OF THE KNIGHTS: *this castle, the plan of which is shown above, "the most splendid and the most impressive of the Crusader castles" stands, owing to careful restoration, much as it did when the Crusaders left it. In the centre of the main courtyard is the refectory with the chapel to the left of it. The great slant wall sloping out beneath the southern towers is eighty feet thick. A section is shown on page 87.*

* The following are among the authorities :—
E. Rey, *L'Architecture militaire des Croisés*, Paris, 1871;
C. Enlart, *Les Monuments des Croisés dans le Royaume de Jerusalem*, 2 vols., Paris, 1934;
T. E. Lawrence, *Crusader Castles*, 2 vols., Golden Cockerel Press, 1936 (stimulating but inaccurate);
P. Deschamps, *Le Crac des Chevaliers*, 2 vols., Paris, 1934;
K. A. C. Creswell, *Early Muslim Architecture*, 2 vols., Oxon, 1932 and 1940.

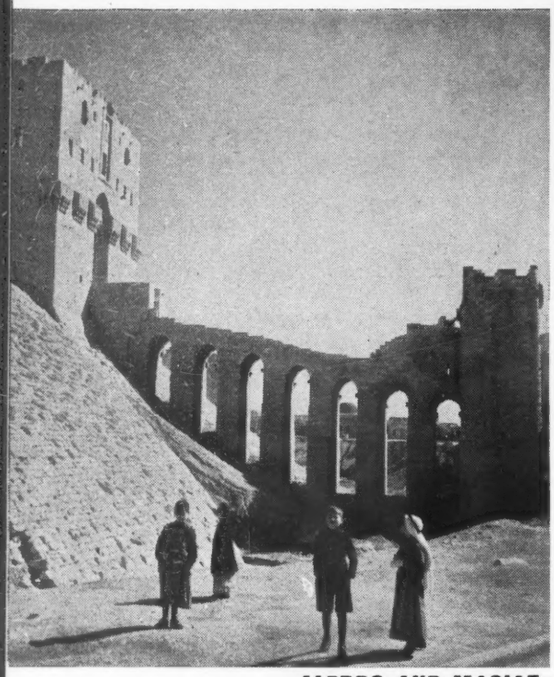
Masonry and Walls. Massive walls and the use of large building stones were in the ancient tradition of Syrian and Phœnician construction (Baalbeck in this context at once springs to mind). The Frankish architects revived this tradition. Their masonry is excellent and their massive walls are so well put together that the mortar is often hardly visible and the work at first sight resembles free-stone building. However, unlike the Syrian free-stone workers of the Byzantine period who built the churches of northern Syria, they often filled the centre of their walls with rubble and mortar in conformity with the practice of mediæval castle building. The face of their walls is also characterized by what is known as *bossage*, an effect produced by only levelling the fitting surfaces of stones and leaving a rough "boss" in the centre of each stone. This treatment, which both adds thickness to the wall and economizes labour, was not used either previously in mediæval Syria, or in France before the thirteenth century. It had, however, been common in Syria in classical times and the Franks, who adopted it soon after their arrival, may well have copied it from classical models. The Arabs did not begin to use it until about a century later.

The masonry of the earlier Byzantine fortresses was on the whole relatively light. Eastern siege tactics prior to the crusading period were most imperfect and thin walls were thus adequate. Sometimes indeed they were so thin that the *chemin de ronde* had to be carried on corbelling or on interior arcades (as occurs in the walls of Resafa, east of Aleppo). The Byzantines calculated also on supplementing the fragility of their stonework by ample garrisons, which—as we have seen—the Crusaders could not usually afford to do, and by deep protective ditches.

SAHYOUN: *the most remarkable feature of Sahyoun, on the left, is the divide, shown in the smaller photograph, which was once spanned by a drawbridge carried on the remarkable one hundred and ten feet high pinnacle of rock, which rises sheer from the bed of the hewn channel.*

Towers and Flanking Fire. At the time of the First Crusade towers in Europe were not built along curtain walls to provide flanking fire, and the Franks in Syria probably took over the idea from the Byzantines. The latter had for centuries strengthened their walls in this way, but had usually been content to employ towers that were square in shape and projected a relatively small distance from the castle wall. In Syria, Halebiyeh is a nice example of such early fortification. The Byzantines also tended to place their flanking towers pretty wide apart. In these matters, in the centuries immediately preceding the Crusades, the Arabs followed the Byzantine practice. It would give the wrong impression, however, to pretend that the Byzantines and Arabs had *never* used anything but shallow square towers. There are, for instance, four round corner towers at Resafa. The walls of Kasr-el-Heir, east of Palmyra, are wholly furnished with round towers, and at Ukhaidir, south-east of Syrian territory, the walls are flanked with round towers only some ten yards apart.

The Franks with their flare for military architecture at once realized the importance of the Byzantine flanking towers. But they also grasped that the fire provided along the walls was more effective if the towers had considerable depth,



ALEPPO AND MASIAF:

above, the Saracen Gate at Aleppo Castle, and above right, the castle of Masiaf, one of the Assassin strongholds. The Assassins were members of the heretical Ismaili sect, and under Rachad el Din Sinan, "the Old Man of the Mountain," their friendship was of considerable value to the Crusaders. The castle is typically Byzantine in character; a simple shell construction, with light walls and square flanking towers. The photograph should be compared with the general view of Krak on p. 89. The contrast between Masiaf and the complex Crusader stronghold is at once apparent.

and that the round tower was definitely better than the square. Not only was the round tower more solid, but it was more easily defensible, as the accompanying diagram illustrates.

*1. Rectangular curtain-tower. 2. Half-round tower of same diameter. Arrows indicate lines of fire from given points on the curtain wall.**

Thus in Syria round flanking towers of considerable salient providing carefully schemed covering fire are characteristically Latin. It was the Hospitallers who best exploited their possibilities and in the great castles of that Order the transformation which the Franks effected in the old Byzantine conception of the flanking tower is very clear. Lines of fire, thanks to the Crusaders, came to be so admirably devised by the end of the twelfth century that Richard Cœur-de-Lion boasted of his castle at Les Andelys, which incorporated all the Syrian innovations, that it "might be held even if its walls were made of butter."

The Keep. Though the Byzantines had erected keep-like citadels in their fortified towns, the square keep was essentially a Norman creation and came into fashion just before the First Crusade. Almost more solid than anything except the concrete fortifications of the twentieth century, the keep was admirably suited to the conditions of early feudal warfare when forces were small and siege tactics not fully developed. On the other hand it suffered from the weakness inherent in purely passive defence. It provided no flanking fire, and could accommodate for obvious reasons only a very small force. That force, moreover, could be hopelessly blockaded, since, with the one small entrance that prudence dictated, sorties were almost impossible. It has been said that a keep could be defended by one man; perhaps; but it has also been rightly pointed out that "it could certainly be besieged by two, standing one each side of the doorway to prevent egress." The weakness of the keep had not, however, been made clear at the time of the First Crusade. It was in its hey-day, and the Crusaders on their arrival everywhere put up what they believed to be the latest word in military architecture, as indeed it then was. The massive square keeps of Sahyoun, Safita, Chastel Rouge, Byblos and Banias, are examples of this importation. Local conditions, however, necessitated an important modification. In Europe keeps were not normally vaulted, but in Syria owing to the lack of timber each storey had to be carried on stone vaults. This meant that though tremendously massive—the walls of the keep at Sahyoun are over twenty feet thick at ground level—the Syrian keeps did not attain the height of their European prototypes.

The early keeps in Europe had been placed at the strongest point in the castle. This was soon discovered to be an error, since it was the point of weakness which really called for the greatest strength of fortification. Thus the keeps, or fortress-keeps, at Sahyoun, Krak, and Markab, are situated at the point where the natural defences are weakest. By the thirteenth century this disposition had become universal. The keep simultaneously underwent a change in shape and the round keep displaced the square. The angles of the latter were too susceptible to mining and it offered the same disadvantages from the point of view of fire as the square flanking tower. It is characteristic that the early twelfth century keep at Sahyoun should be square, while the later fortifications built by the Hospitallers have round keeps or at any rate round towers to their fortress-keeps.

Portcullis, Bent Gateway, Machicoulis. The portcullis, though known to the Romans as early as the end of the third century B.C., was apparently in Syria a Frankish importation and was not used in the Byzantine and Arab castles of the Middle Ages. The device of employing a bent entrance at castle gates to avoid the danger of the gate being "rushed," especially when the defenders were withdrawing into the castle after a sortie, was of even older origin, since two isolated examples have been found in Egypt dating back to the second millennium B.C. However, in spite of an eighth century example at Baghdad, the bent entrance did not come into general use until the time of the Crusades. The Arabs were then the first to exploit the device, and the finest remaining example is their magnificent five-angled entrance to the castle at Aleppo, built in the thirteenth century.

Though, in twelfth and thirteenth century France, castle walls and towers were finished with wooden hoardings to provide cover for the defenders, the timber shortage in Syria made this impracticable. It has been suggested that this difficulty was directly responsible for the development of machicoulis. This device is apparently purely Syrian in origin and is first found, though not always employed for military purposes, in some of the ruined Byzantine towns near Aleppo, and later in the eighth century fort at Kasr-el-Heir. After this date it seems to have been forgotten, only to be revived in the crusading period. However, though there are examples at Krak and Banias, the Crusaders did not so much make local use of the machicoulis as introduce it into Europe from the East. As a result of this importation, continuous machicolation appears in Europe from the fourteenth century.

The Concentric Castle. The origin of the concentric castle (i.e. a castle having a double or even triple girdle of walls), of which Krak is a perfect example, is much debated. Byzantium and other Imperial towns had double walls, and the fortifications of the Caliph Al-Mansur's circular city at Baghdad also foreshadow the concentric castle. It has thus been supposed that the Latin kingdom adopted such a scheme of fortification from the Byzantine east, whence it in due course passed to Europe and revolutionized western castle-building. Richard Cœur-de-Lion's chateau at Les Andelys (1196) has been pointed out as the most important and immediate example of the transference of this Byzantine conception to the West.

On the other hand it seems equally possible to suppose that the concentric castle may have been a natural development of the keep-castles of Europe. There, as the disadvantages of the simple keep became evident, architects began to replace it by the shell-keep, essentially a keep-fortress but built round an open courtyard. These shell-keeps were supplemented by outer defences. The latter usually consisted in a curtain wall which, springing from the keep itself, encircled a considerable outer area known as the "bailey." The further enlargement of the shell-keep (until it virtually resembled an inner ward) and its complete isolation from the surrounding "bailey" wall, was a very natural step. Once this step had been taken the concentric castle was in existence. It is maintained that so simple and organic a development was almost inevitable as siege tactics improved and the prestige of the traditional keep declined, and that it was thus hardly necessary for architects to travel to the Holy Land to evolve the type. Further, if models were really needed, western builders had them at hand in the concentric earthworks of the Roman and Saxon castles. In view of such opposing claims as to the origin of the concentric castle it seems difficult for the amateur to come to any conclusion. Perhaps the truth is that the problem at present does not admit of a definite solution one way or the other.

The architectural genius of the Crusaders found its highest expression in the buildings of the Military Orders. The Templars did not choose to exploit the new conception of the concentric castle which was made so much of by the Hospitallers and by the architects of Western Europe, and unfortunately many of their major castles, such as Arima, Chastel Rouge, Safita and Tortosa, are to-day sadly ruined. Time has been kinder to the work of the Hospitallers and the exact character of their building remains clearly visible at Krak and Markab. Particularly in the former the typical Latin solidity and mass are evident, plus the provision of careful flanking fire, ensured by round curtain towers of adequate depth spaced at reasonably close intervals, plus—and here the greatest revolution appears—the fullest possible acceptance of the principle of concentric fortification. Krak consists essentially of two castles, the outer and the inner, and the latter remains a self-contained unit, workable for offence and defence, even when the outer ward is lost. In the vast strongwork above the "Mountain" wall survives the last echo of the old Norman keep, and perhaps nothing shows more clearly than this great bastion with its linked towers how far the Crusaders had taken military architecture in little over a century.

(This article forms part of a forthcoming book on Syria and the Lebanon by Mr. Robin Fedden.)

*From T. E. Lawrence, *Crusader Castles*, vol. I, plate 12.

DESIGN REVIEW

for a discussion of new designs, new materials and new processes, with a view to developing the essential visual qualities of our age: functional soundness, the outcome of science, and free æsthetic fancy, the outcome of imagination.

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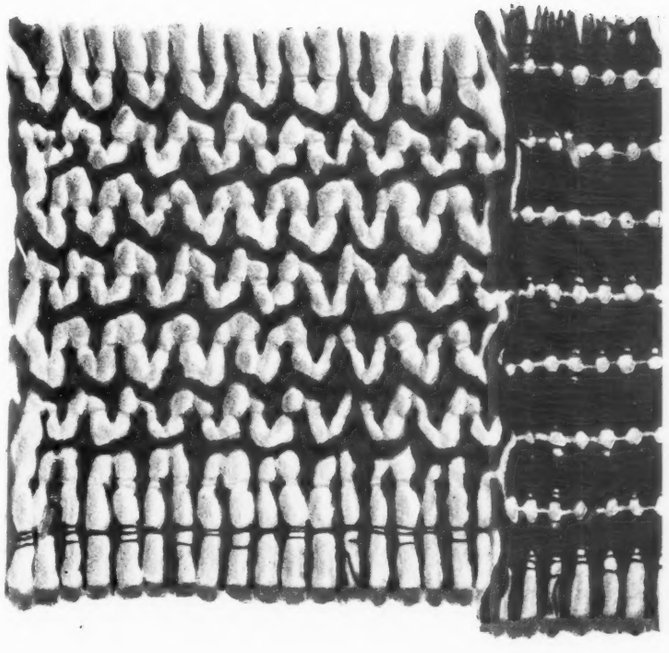
WOVEN TEXTILES:

"Hand weaving to-day is a rediscovered craft in England, for during the last century it had succumbed to the machine; at the beginning of this century not more than half a dozen hand-loom workshops were in existence. In the remoter parts of Scotland, Ireland and Wales the trade persisted, partly to meet local needs, partly to supply a luxury demand. The public had become gradually accustomed to the deadly machine finish which makes things look so much better than they are." These are the words of Ethel Mairet—weaver, writer and teacher. We respect them because we know that Mrs. Mairet turns to hand weaving not for the purpose of machine boycott but for the sake of machine mastery. It is she who says also, "Hand weaving has been in danger of developing on wrong lines. It has set itself up on a pedestal as an 'art,' instead of recognizing its immense and interesting responsibilities to present needs and to the machine. But it has more responsibility to the machine than any other craft. It is harder to become a well-trained weaver than a well-trained metal or leather worker or a printer. There are more things to be learnt and a more varied technique to be acquired. The essence of hand weaving is in its continual creativeness and flexibility (this is also its danger) based strictly on traditional knowledge. It is dependent on architecture and clothing; it must work in close collaboration with both. It cannot even be an art by itself (as a beautifully printed book can be, or a fine piece of metalwork) for always it must be part of a building (curtains, rugs, hangings, etc.) or associated with the necessities of life (clothes, table cloths, towels). It is far from just throwing a shuttle."

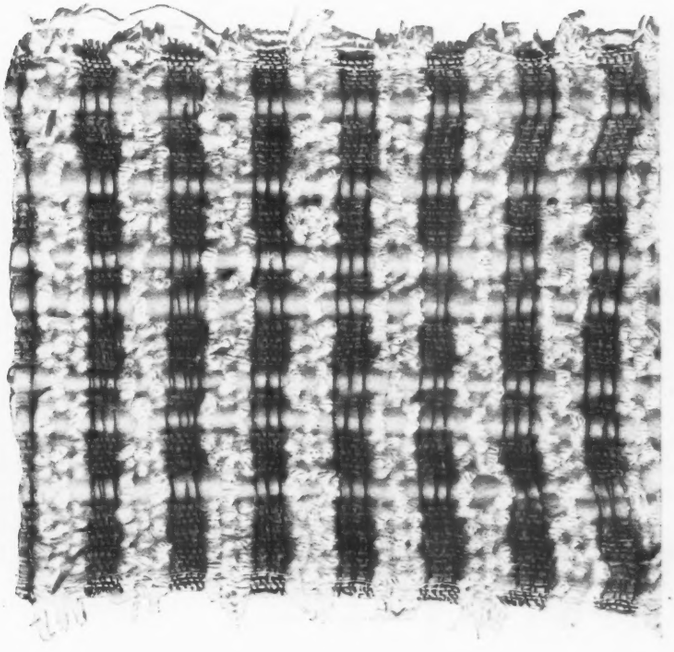
Those who wish to know how far it is from just throwing a shuttle must refer to Mrs. Mairet's own books. Hand weaving as she understands it is a study which extends back to the breeding of sheep and which takes into account the whole range of weaving materials old and new. It is informed by historical study. It has its basis in constant experiment with yarns, dyes and weaves. It is often basic research which can be applied to mass production.

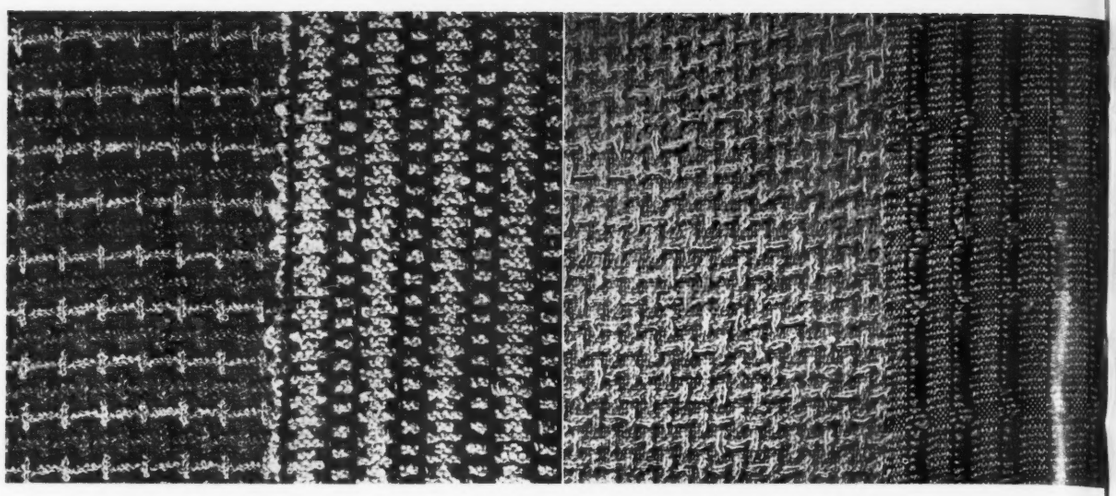
In a period when mass production tends to flatten out variety, it is interesting to note the growing relationship between the experimental hand-loom weaver and the textile industry. Many of the pupils trained by Mrs. Mairet are now working within the industry itself. Others are training students to design for the machine without losing sight of the qualities of the experimental work. That is as it should be. And we can at least visualize an industry geared up for high rates of production, but whose products are constantly guided, developed and enriched by highly sensitive designers working out their experiments on the hand-loom. Already this is taking place and we take the opportunity of giving it what support we can by these notes and the accompanying illustrations.

123 *By Ethel Mairet—in coarse and fine wools; a very large scale pattern with a change of pattern on the reverse side, which could be most interesting as a hanging over an opening where both sides could be seen, particularly rich in effect and in keeping with a contemporary æsthetic which requires rich allover textures.*

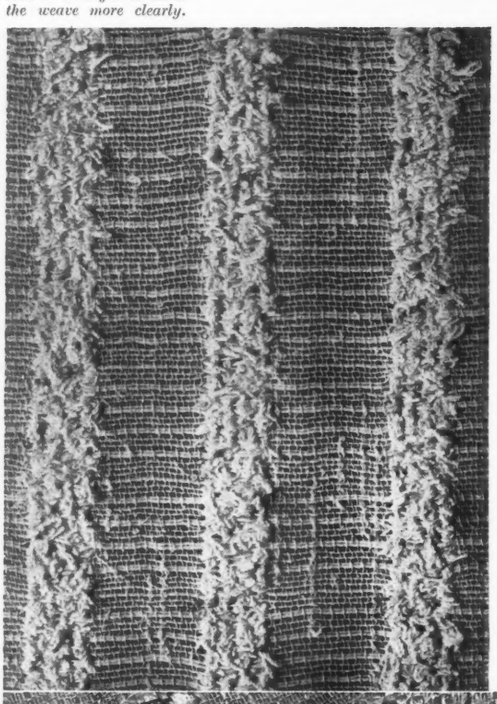


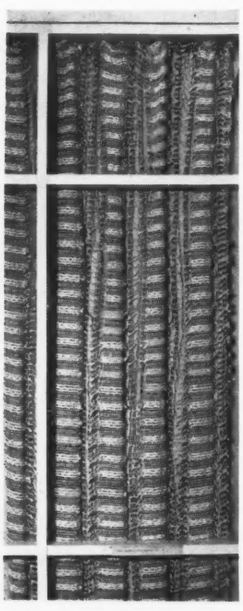
124 *By Ethel Mairet—here is a sample of modern weaving with no less richness of effect and colour than that obtained by any weaver in any age. The mustard yellow is a particular favourite with Mrs. Mairet and the fine threads of silk in scarlet, yellow, blue and green appearing here and there create an effect comparable with a fine jewel.*



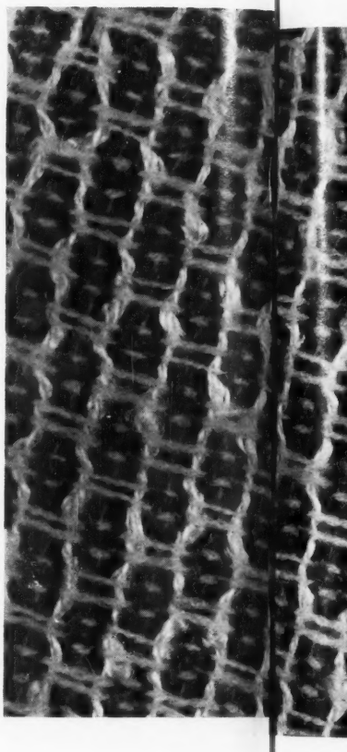


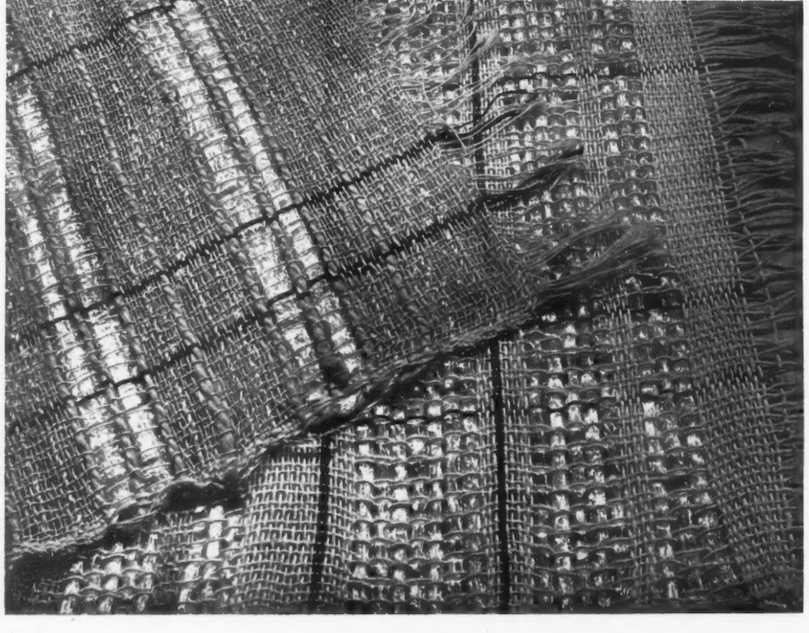
125 *By Ethel Mairet —a dress or coat material in various cottons woven to give elasticity. The illustration is enlarged to show the weave more clearly.*





126 *By Ethel Mairet —a fabric with an open weave which could be used as a hanging to give an effect of enclosure to a space. It can be seen through, so that it would be very suitable where something more elaborate than a net curtain is required. This sample was shown at the Arts Council Exhibition in the National Gallery last summer.*

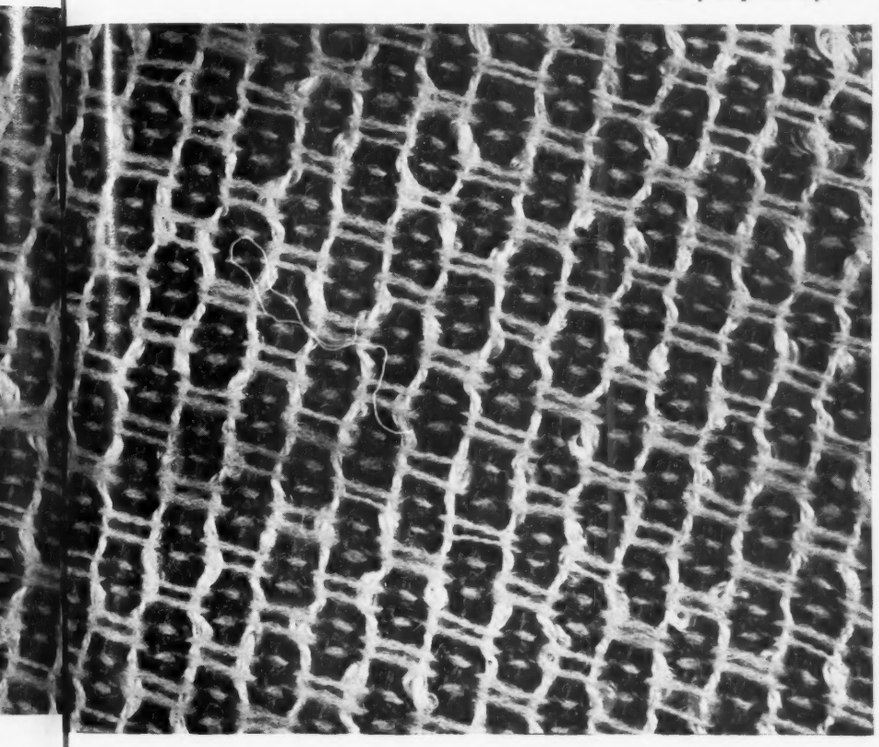




127 *By Ethel Mairet —two wall cloths in cotton and cellophane, showing a really brilliant use of a new material. The effect gets right away from that of a superficial or smart display often associated with the material and shows its new possibilities and qualities in giving life and sparkle to textiles.*

128 *By Margaret Leischner —two experimental weaves using cellophane with a plain cotton backing (seen in the corner of the photograph). These provide a textile with an all-over brilliant shiny surface capable of a large variety of applications.*

129 *By Margaret Leischner—here we see the results of a hand loom weaver working for industry. These four fabrics are taken from many woven by Miss Leischner for R. Greg's. This firm for many years has manufactured fancy yarns. Now they have had a strong feeling that the esthetic achievement of woven fabrics does not only depend on a designer of the weave, but may be decisively influenced by a special designer of yarns, if this part of the textile manufacturing process were taken seriously enough. A yarn used the wrong way—a very common fault—is a yarn wasted. But how will people use it the right way if, for instance, according to the usual method, it is shown only wound round cards? Greg's are designing their yarns with a special type of fabric in mind. They are then woven up, and if for any reason they are found unsuitable, the structure of the yarn is altered until the desired effect is obtained in the woven fabric. As an example of this, most of the samples submitted to* DESIGN REVIEW *were furnishing fabrics made very largely from jute. The manufacturer's problem was to overcome the harshness of jute by making first the right type of yarn and then by weaving it into the right kind of design. Left is in various shades of green. The cotton gimp yarn is doubled with various tones of green, thus giving more fullness of colour than a gimp yarn dyed in one shade only after doubling. In left centre, the colours used are nigger and off-white, and very spare threads of bright peacock green. Right centre shows a furnishing fabric in beige and off-white made in cotton and jute gimp yarns with an artificial silk stripe effect; and on the right is a furnishing fabric in navy and beige, again in cotton and jute gimp yarns.*



130, 131 *By Margaret Leischner — two designs which both achieve a remarkably luxurious and close all-over pattern. Both show the stimulating effect and richness of pattern which can be obtained by contrasting types of yarn. They demonstrate, too, the play of rhythms which a first class designer can produce even within the strict limits of warp and weft.*

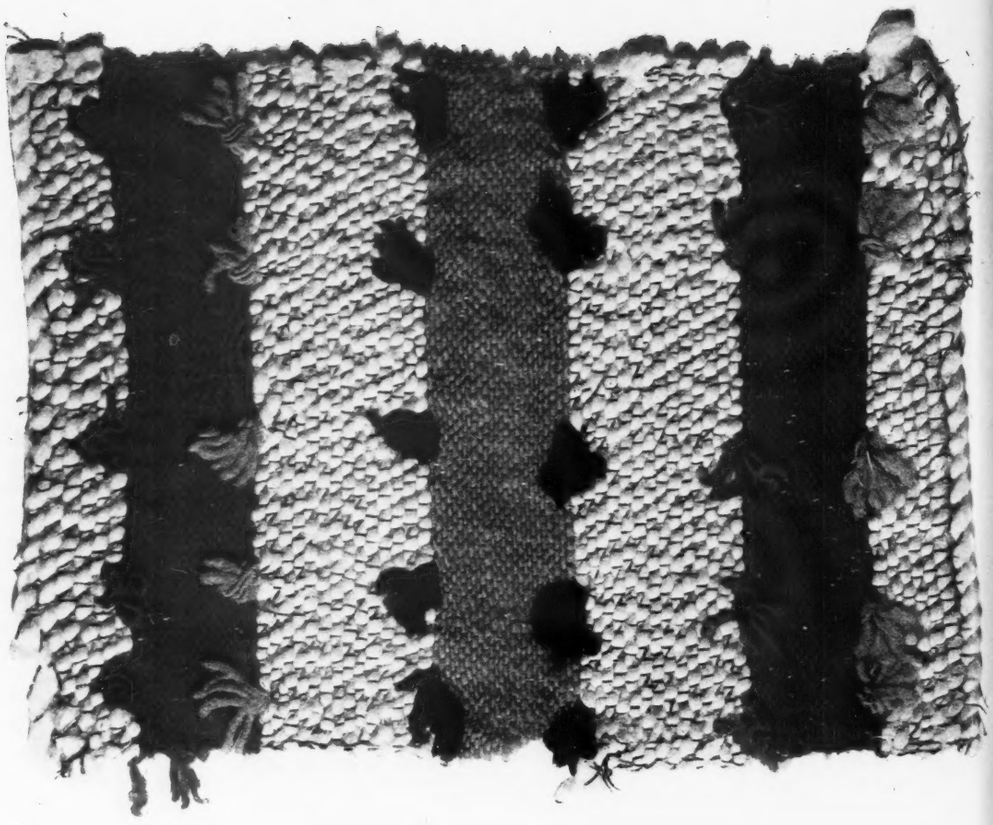
132 *Anonymous textile patterns. In the background a series of utility floor cloths and dish cloths, and in the foreground a black and white table cloth. Probably quite unintentionally, these display a range of colours and textures which can hold its own with many specially designed furnishing fabrics.*

133 *"Marr" by Alastair Morton for Edinburgh Weavers—an all cotton hanging in self colours, produced by a designer who is aware of the qualities of the hand-loom weave and who has been able to retain these in the mass produced textile.*

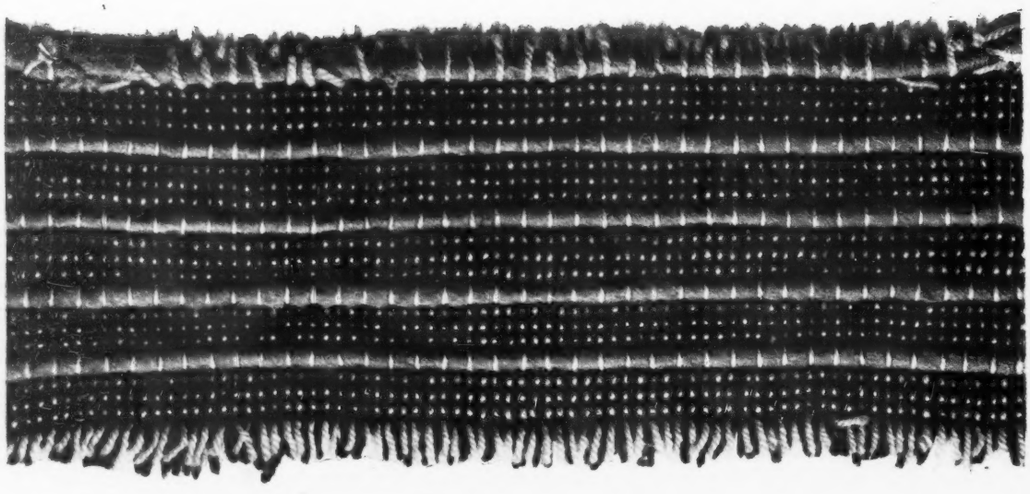
DESIGN REVIEW

next instalment

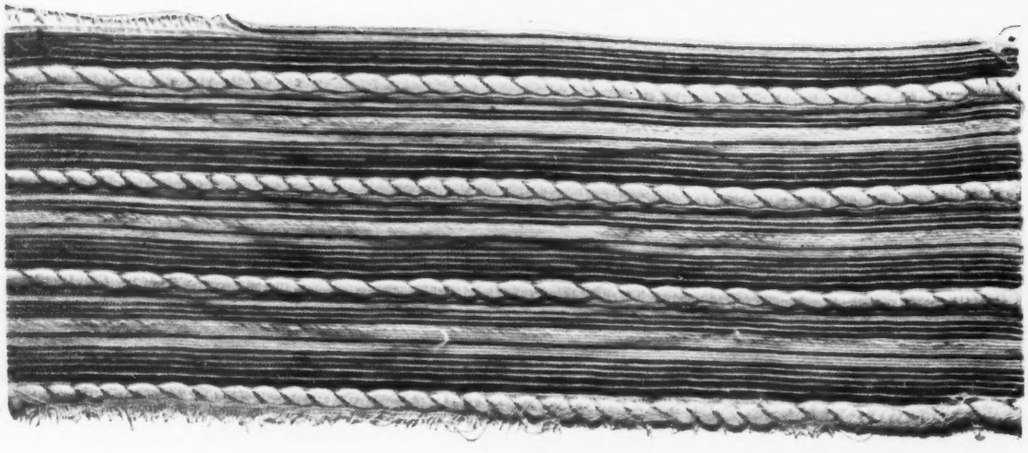
household equipment



134 *By Joy Jarvis—a particularly lovely big scale pattern, using an interesting combination of colours. It has a fancy black and white cotton warp and a weft of bands of a dark mustard yellow, a blue, and a white wool, with tufts in the yellow and blue and also in black and wine red. Used as a curtain it would give an effect of luxury, and could be successfully used for curtains in some public building, an hotel or a theatre.*



135 *By Joy Jarvis–an all-wool fabric which obtains its effect by contrast in thickness of thread and by the unusual restraint and simplicity of both the weave and the colour.*



136 *By Joy Jarvis—a voile dress material designed to show how fabrics can be made interesting by contrast in the texture of thread used and by good proportions and colours.*

BOOKS

New Uncertainty

NEW ARCHITECTURE AND CITY PLANNING. A symposium edited by Paul Zucker. The Philosophical Library, New York, 1944. $10.

THERE can be little doubt that we are turning a corner in architecture, which, twenty years ago the playground of visionaries, life reformers, social and æsthetic revolutionaries, has come down to earth in our day with sobering effect. In many respects, this is a welcome development. Yet instead of joining rashly with the gleeful philistine and the pragmatist in an uncritical acceptance of the new realism, the objective observer of the architectural scene should do so only with caution and a number of mental reservations. This is the impression which *New Architecture and City Planning* leaves on one's mind.

In the recent phase of realism, new types of men have become increasingly vociferous, the operatives, in the widest sense of the term. It lends Mr. Zucker's book both interest and topicality, that the operatives' viewpoint is given due prominence. The symposium team comprises technical experts, administrators, scientists, and philosophers (architects figure in all these groups). From " the combination of scholarly examinations, factual reports and emotional credos " Mr. Zucker attempts to distil a common basis for those who build the physical structure of our society. The programme, grouped under the headings *Specific Building Types—New Materials and New Construction Methods—Housing—City and Regional Planning—The Problem of a New Monumentality—Education* is ambitious enough, and the contributors are of sufficiently high standing to ensure the book a wide reading public. But it would bring little credit to the editor (and contributor of a distinguished introduction), if the symposium was judged by lesser standards than he has set himself. Does this book provide more than a sum of good articles ; does it provide a comprehensive picture, even in roughest outline only, of the contemporary architectural problem ?

Let it be said at once that the book fails by these standards. This is due to causes that lie at the roots of the architectural situation, and are therefore worth closer scrutiny.

The symposium confirms the suspicion that a total view of architecture, such as prevailed in the twenties and thirties, is no longer possible to-day. All the progress in specialized knowledge of building and planning technique cannot hide this fact. For those who regard architecture as more than a technical feat, that is to say, as a cultural activity, the new realism can be no more than a necessary transitory stage, at best, the consummation of an architectural ideal formed in the preceding phase, but by no means a directive under which architecture will necessarily become a major art once again.

What has happened is that an ideological crisis has arisen in architecture, because the philosophical basis, which gave the Modern Movement its buoyancy, has proven insufficient to sustain it in the present stage of development. The biological and economic materialism manifested in an uncompromising functionalism, and the æsthetic materialism manifested in constructivism, are no longer generally accepted as valid ideologies.* And a " doctored " functionalism, to which most contemporary architects seem to subscribe now, is a most insecure basis for purposeful design. Consequently, the cheerful note of progress about the symposium does not ring altogether true, especially if one has an ear for the undertones of uncertainty which transpire in the more speculative articles. A quotation from the editor's Introduction will do as an example :—

> For the generation just past, the ordering principle was the idea of functionalism, the truthful expression of functions through form. For our own, the merging generation, the ordering principle now is the social idea, the truthful expression of sociological conditions through form. The combination of the two ideas will create the new style.

This appears on page 8. But on page 9—

> " Although functional logic has become our supreme architectural law, we have yet to overcome its deficiencies by the emotional impact of creative individuality. In our time such creative individuality can only develop through a deep interest in and full understanding of the basic social problem."

These definitions unfortunately do not take us very far. By introducing " the emotional impact of creative individuality " the meaning of the functional and sociological approach is widened to the point where it can no longer serve as a useful strategy. And to link creative individuality with an understanding of the social problem is a patently controversial matter. Mr. Zucker's definitions have the opaque quality characteristic of the school of architectural thought which tries to pull out of the Marxist dive without the heart to bale out altogether. (See also Maxwell Fry and Sigfried Giedion.) The latest and probably last materialist heresy, which estabiishes the social idea as the determining factor in architectural expression—though it may influence architecture in the immediate future—breaks down in that realm which is dealt with in the section *The problem of a new monumentality.*

Cultural form is directly representative of social conditions only in a very specialised realism. If this may be more apparent in other arts, it is equally true of architecture, an architecture, that is to say, which is not limited to utilitarian buildings only. This brings us to the most important part of the symposium, which deals with monumentality.

It may serve as a warning against the fluid state of speculation in this field that in another symposium published nine years ago the death of the monument was solemnly announced.* To-day, as one symposionist says, monumentality is something modern architects are remarkably concerned about. That is true ; more significant still, it is not only the specialised problem of monumentality in the strict sense of the word, but the whole non-utility aspect of building which causes common concern. For many reasons, the contemporary architect seems better equipped to build for a world of poverty than for one of material and spiritual riches. For him the design of civic monuments as well as that of any cult building has become problematical. This is the result not so much of formal impotence, for which the new structures and new materials or experiments in the Picasso studio could provide a remedy, but of the underlying ideological weakness mentioned earlier on. It is the shaken beliefs and the lack of a new creed which play into the hands of the revivalist designer of civic buildings. Moreover, in the absence of an acceptable ideology the development of rival æsthetics is encouraged, one set of values for utility, another for non-utility buildings. The one has all the formal qualities of machine production, the other aspires to what some call the eternal qualities. Such eminent architects as Asplund, Perret, Honegger, have already turned to a new and chilly classicism for their crematoria and universities. This development towards a split æsthetics is typical of our split society. It is a trend which architecture will follow as long as there is no pervading idea to assimilate the machine as a cultural factor in a unified world picture. The symposium seems reconciled to the split architecture in so far as it discusses the non-utility aspect as applicable only to specialised building types. For those looking further ahead, however, other possibilities suggest themselves, which should not be lost sight of altogether, even if they may not be immediately realizable.

There is no reason to suppose that we shall always live in faithless times. Signs multiply of new creeds, which may weld the break in our culture. They may take the form of a new humanism or a new mysticism. At such times only, a total architecture seems possible which produces profane and sacred buildings that are equally worth remembering. At such times all building is symbolic, differing only in degree. The formal quality of the medieval house belonged to a world of form at the apex of which stood the cathedral ; the Parthenon was the apotheosis of the Greek house ; the Renaissance order was all embracing, and under a new humanism contemporary Swedish civic art blossoms out of a domestic architecture to which it is linked by a close æsthetic affinity.

All these achievements of total architecture appear to be the products of a non-materialist bias in architecture. For that reason the work of our more metaphysical architects deserves perhaps more attention than they get at the moment. Both Frank Lloyd Wright's work (which cannot be exhaustively described by Hitchcock's term " in the nature of the materials ") and in a more subtle and European way that of Alvar Aalto, seem to belong to this category. Such a new evaluation should also not fail to consider, even if for curiosity's sake only, the non-materialist building philosophy of the theosophical movement of Steiner's. Amongst these sources and others the germs of a future, antithetical architecture may conceivably be found.

Even if architecture has to develop its strength in other directions at the present time, that is, towards greater social usefulness and technical efficiency, such wider aims should not be lost sight of altogether. It should be remembered that it was the ambitious universality of the modern movement in its most confident phase twenty years ago which brought followers to its camp, in a way no other cultural movement could boast of since the Renaissance.

If I have kept to the more distant perspectives of architecture, this is perhaps a natural reaction against the over-optimistic views concerning technological progress which this, like many American publications, tends to express. Moreover, the symposium has as its publisher the Philosophical Library, and as editor an architect whose interests, I take it, lie in the field of architectural theory. In order, however, that the reader should not get a wrong impression of the book, I hasten to add that the majority of articles in it deal with such innocuous matter as Department Stores and Office Buildings, World Fairs, Plywood, Plastics, Changes in Real Estate, Layout and Organisation of Farms, Ocean Liners, Reformatory and Prison Design. There are about one hundred discriminately chosen illustrations.

G. M. KALLMANN

*See Peter Mayer, " Situation der Architektur, 1940," published in *Das Werk*, Zurich, September, 1940.

*Lewis Mumford, " Death of the Monument," *Circle*, 1937.

The Tree and the Set-Square

OUR HERITAGE OF WILD NATURE : A PLEA FOR ORGANIZED NATURE CONSERVATION. By A. G. Tansley. Cambridge University Press. 7s. 6d.

A HOUSE, though one would not always think it, is something built round human beings, a form finely adjusted to their shape, their size, their habits, their interests and their needs. A Wiltshire farmhouse, shall I say, two or three hundred years old, is likely to be something which has, in a sense, grown round its inhabitants like the fur round a cat, in contrast to houses we all know, in the building of which the fine balance of relations has been upset ; houses forced down onto their inhabitants with the effects of a hutch onto rabbits or an old pail onto rhubarb. A close multiplication of these shabby hutches and old pails makes up an industrial town such as Swindon, or a geometrical view such as spreads round beneath one below the heights of Alexandra Palace. A house does not end with its own walls, but extends into the land which surrounds it, or surrounds the group of buildings of which it may be a part. Without needing to be conscious or deliberate about it, those who built the farmhouse in Wiltshire, not only made the house right in relation to the men inside it, but right in relation to the country outside it. They were like George Sturt's wheelwrights, who could make a wheel, but not tell you how. And what was done unconsciously in an altering tradition, now has to be got at consciously, without a tradition, by a careful calculation of needs and harmonies. They are not often calculated with success.

In fact, reading Professor Tansley's book, I wonder very much how deeply even good architects and good planners understand those harmonies in their refined details. Professor Tansley wants the conservation of natural beauty in the midst of planning ; and most planners would virtuously retort, that they know all about gardens, green belts, beech trees, and natural beauty. But if you wish to conserve a piece of natural scenery beautiful in the way in which it has been partly modified and stabilized by human interference, and with its typical birds, animals, butterflies, flowers, you must understand exactly what the continuance of that beauty depends upon. A very simple case : a chalk down : " A chalk down is maintained as open grassland by the constant grazing of sheep. If this is discontinued it is invaded by shrubs and trees and eventually becomes scrub, yewwood, ashwood or beechwood. To preserve it as open grassland the grazing must be maintained." The character of vegetation may depend on the life of animals (ourselves included), as the animal life depends on the vegetation. In this refined, intimately woven pattern of ecology, even an insect that no planner has ever heard of, can have its importance ; and the proper conservation of wild life or scenery of any kind does not simply mean putting a fence up and saying, in fashionably decent lettering : " This is an open space " : it depends upon an intricacy of scientific knowledge. In the Wiltshire farmhouse age, the ecology, roughly speaking, looked after itself (planning is, or should be, only an applied ecology), and the threats to it were not on our enormous scale.

Professor Tansley would not want every town and country planner to be a trained field ecologist ; but he wants the information to be available, and to be applied for, and applied. If the natural beauty of the British Isles is not to be damaged still more than it has been, and its characteristic variety of surface and variety of wild life are not to be changed still more, there should be set up, he thinks, an Ecological Research Council, parallel, under the Lord President of the Privy Council, to the Agricultural and Medical Research Councils. And this Council should control a National Wild Life Service as well as National Nature Reserves. Excellent. But to expect it (I hope I am wrong) would be to overestimate our general sensitivity and intelligence, as well as the intelligence and education of any government we are likely to elect. We may—of course we may—get another Prime Minister who can recognise a grey wagtail in

St. James's Park, or a Foreign Secretary who happens to have seen a rare plant on Ben Lawers, or even (because he once did Sophocles in the sixth form) a Minister of Education who knows what the word "ecology" signifies; but since cultural and scientific needs of a still unfamiliar kind are involved, that won't be enough to get natural things intelligently and creatively conserved. And it cannot be done piecemeal by individuals or local authorities or societies. Professor Tansley's conservation considers the living future. The kind of conservation we get, with governmental aid, wriggles back to the past, and is content with shaving, shampooing and pointing a castle, and charging sixpence to look at the ruination of ruins.

GEOFFREY GRIGSON

Answering MARS

HOW SHALL WE REBUILD LONDON? By C. B. Purdom. J. M. Dent & Sons. 12s. 6d.

WHEN approaching a book the first two things one wants to know about it are What is the subject? and For whom was the book written? The answers to these two questions will probably determine whether one reads the book or not, unless the author is a very special person. *How shall we rebuild London?* is a large and unmanageable subject and Mr. Purdom has chosen to address an almost equally unwieldy audience. "I have had in mind," he says, "that while the task of planning and building is for technical men, architects, engineers, surveyors, town planners and builders, together with the municipal authorities, the decision as to what kind of city the new London should be, should not be theirs alone. The citizen has a part to play and a responsibility to discharge and this he should be enabled to do. Moreover, the technical men themselves and the public officials have to consider the problem from the most inclusive point of view and from entirely new angles." All of which is true, and no doubt there should be some technique of writing and presentation which makes it possible to cover every aspect of life in a way that satisfies almost every type of mind. But if there is, it involves something more elaborate than beginning at the beginning and going straight ahead till one gets to the end. Such a method makes so many people read so much that does not interest them, that most people miss what would. In trying to appeal to everyone Mr. Purdom has forsworn the most obvious basis for selecting and arranging his facts. And so the book is difficult to read, which is a pity. The author takes nothing for granted. He digresses on every subject that is at all relevant to the replanning of London from the reorganisation of theatre land to the reform of rating. In doing so he gives the whole subject a shake up which rather confuses the main issue. This occupies about two-thirds of the book. The rest is devoted to answering the question: How should we rebuild London? Mr. Purdom's answer, very briefly, is that the city and county should be amalgamated to form the new London; that a green belt should be cleared round the county boundary, and that fifty new towns should be founded in the London Region—a new region considerably larger than the London traffic area—to take the displaced population. Houses with gardens should be the order of the day. It is the garden city's answer to the MARS plan.

A. TATTON BROWN

Preservation for Use

THE NATIONAL TRUST. Edited by J. Lees-Milne. B. T. Batsford. 12s. 6d.

THE National Trust was founded in 1895 by Octavia Hill, Canon Rawnsley and Sir Robert Hunter. Their shades should be gratified by this recognition of the movement which they initiated fifty years ago. A team of twelve eminent authorities, captained by the Master of Trinity and umpired by Mr. James Lees-Milne, have made a very impressive display of the Trust's achievements.

It is a revealing record, and comforting in its revelations. Comforting, because it shows that the Trust has not confined itself entirely to dubious British and Saxon forts, provincial Roman floor-mosaics and the Lake District. There is still, to be sure, something of a Lake District tendency; that, perhaps, can be traced to a rather too donnish control of the Trust in the past, and it is much to be hoped that in the future the professorial element will feel that they and their imitation Switzerland have, perhaps, received sufficient recognition.

Professor Trevelyan, in his Introduction, makes some very important and pertinent observations. First, that the Trust wishes to avoid turning its properties into either "beauty spots" or "museum pieces"; its object being that natural beauty should remain "natural" and that agriculture should continue to flourish as agriculture. Second, that the townee will now learn that food is not merely something you buy in shops, but is a thing produced by skill and labour in the countryside, the farmer's workshop. And third, that while natural beauty is now more highly valued than ever before, it is being destroyed more rapidly than ever before. Thus arises the unfortunate necessity of having to make rules for the preservation of beauty—beauty both natural and man-made.

The wide scope of the Trust's activities can be appreciated by the subjects of the ten essays in this volume. Mr. Ivor Brown writes on National Parks; Mr. Harry Batsford on Country and Coast; Mr. Graham Clark on Ancient Sites; Mr. John Russell on Historic Shrines; Sir William Beach Thomas on Nature Reserves; Mr. John Harvey on Mediæval Buildings; Mr. G. M. Young on the Manor House; Mr. Lees-Milne on the Country House; Mr. Basil Oliver on Country Buildings; and Mr. John Summerson on Town Buildings.

The last-named writer, dealing with a class of object particularly liable to hasty and wanton destruction, manages to sweep away a number of cobwebs which only too often blur clear thinking. Having formulated five categories of buildings which should be considered as worthy of preservation, Mr. Summerson reminds us that the beauty of buildings which are clearly "works of art" depends on form, not on sentiment. Their artistic value, therefore, is not diminished by accurate reconstruction. Buildings whose value is not artistic, but is historic or associational or romantically evocative, are, of course, quite another matter; such value is very perishable.

In addition to these ten essays and Professor Trevelyan's Introduction, there is an Appendix by the Secretary of the Trust, outlining the progress, the aims and the methods of the Trust. There is also, be it noted, a very good index.

The 113 illustrations, ranging from West Wycombe Park and Bodiam Castle to Wicken Fen and terns on the Farne Islands, form in effect a survey of the English scene and are fully worthy of Messrs. Batsford's high reputation. But it is, perhaps, not unfair to say that a watercolour of the 1840's does not tell us much about what a Trust property looks like now.

JOHN STEEGMANN

For Serious Student and Enthusiast

ENGLISH CHURCH DESIGN, 1040 to 1540. By F. H. Crossley. B. T. Batsford. 12s. 6d.

THIS is a "popular" book on architecture, of which there are far too many. That is to say that the writer of such has no time to criticise his historical assumptions, with the result that the general reader forms the impression that everything is settled and beyond the reach of historical criticism, which is very far from the truth, to-day. Thus Mr. Crossley speaks of the "Severn Valley style" as if it were a fact, whereas it is an hypothesis. He makes too much of the Black Death. Tombs, after, are not worse than tombs before. You may prefer the tomb of Eleanor to the tomb of Edward III, or of John of Gaunt, but that is a question of taste, not of history. Mr. Crossley has himself pointed to the great value of tombs in appraising style, in his most useful *English Church Monuments*.

Mr. Crossley has not noted that the old ideas about the cult of Edward II at Gloucester are no longer tenable. He does not mention the contemporary "Saint" Thomas of Lancaster, at St. Paul's, or the significant point that St. Thomas of Canterbury is raking in his thousands of pounds, while the two rival "politicians" at Gloucester and St. Paul's are making what they can. It is not to Gloucester but to Canterbury that the pilgrims go, "the hooly blisful martir for to seke . . ." There is therefore a certain lack of suppleness about the historical backbone of the book.

But this in no way detracts from its great value to the serious student. It is a mine of information, the result of painstaking and thorough research. Where Mr. Crossley is dealing with a feature, he gives a great number of examples, instead of one or two, here and there. This is invaluable. The photography too is lavish, and of a very high order, particularly in the case of the vaults shown. It is a pity that the difficulties of publishing, to-day, have evidently not allowed a larger sized book. Mr. Crossley's photographs need the closest study.

Everything said about Victorian "Gothic" is important and illuminating, and the distinction between repair and that ungodly thing called "restoration" is most clearly drawn. The book is worth reading for this alone, and should be loudly proclaimed at this moment of time for obvious reasons.

There is a useful glossary of architectural terms and a section on mediæval building "personel" which gives an excellent general view of the subject. Mr. Crossley notes the very important fact that the King's Master Carpenter is hired to oversee the building of the wooden Lantern at Ely, but he seems to have overlooked an even more important item in the Sacrist's accounts at Ely. When the work on the Octagon is about to begin we have the entry: "Dat. cuidam de Londonia ad ordinand. opus . . ." "Quis est iste qui venit?" Can this mean that at the beginning of the fourteenth century the architect is already appearing?

J. M. HASTINGS

A Home Counties Hollywood

PLAN FOR FILM STUDIOS. By H. Junge. Focal Press. 7s. 6d.

THIS book, well written and amply furnished with graphs and maps, is appearing at a most appropriate time. Its scope is wide. It not only discusses studio organisation, layout and equipment, but also with special emphasis those questions of planning which are of such paramount importance for the future of the British film industry. For now, after years of war, plenty of studios will have to be re-equipped and new ones built to suit a greatly expanded industry.

There should be no doubt that the expansion of the film industry should fit into the national scheme of post-war reconstruction and location of industry. The building of new studios and the re-equipment of old or partly damaged ones must not be undertaken in a haphazard manner dictated by nothing but immediate requirements.

Mr. Junge proposes to build round the present studios at Pinewood (with Denham as an appendix) a new film centre. The way he puts the problem and his solution are convincing and fit in with the Greater London plans. He leaves other studio groups aside, although it would no doubt be useful to study them, and particularly the Elstree group, in a similar way.

In the pages dealing with layout and organisation, the comparison is especially interesting which Mr. Junge draws between floor areas of stages and administrative parts plus workshops in this country and at Hollywood.

The graphs show that thorough research has preceded publication—a fact worth mentioning as there is really very little known about the working of an industry which by the intrinsic complexity of its nature, and for other reasons, is easily misunderstood and in its value and importance but hazily appreciated.

W. W. KELLNER

SHORTER NOTICES

ARCHITECTURAL PRACTICE AND PROCEDURE. By Hamilton H. Turner. B. T. Batsford. Third Edition. 18s.

Mr. Turner's manual was first published ten years ago. The fact that a third edition is now called for shows its soundness and usefulness. Additions and alterations include the most recent R.I.B.A. forms of contract, the whole chapter on the London Building Acts, that on approximate estimates, a schedule of conditions of repair of property and an inventory and valuation of household effects. The book in its new form will no doubt prove as indispensable to the young architects of 1945 as it was in its original form to those of 1925.

BRICKWORK. By W. B. McKay. Longmans, Green. 7s. 6d.

This addition to the already considerable number of books dealing with brickwork is intended for students attending technical schools and training centres. It covers all the usual features in much the usual manner. Materials are described, bonding is dealt with at considerable length and many usual and some rather special details are illustrated. There is a chapter on drawing equipment and draughtsmanship. Where the book seems to be weak is in its failure to explain the reasons for the methods and details described. For example, there is no really clear statement of the functions of a wall. Typical foundations are shown and model bye-laws are quoted, but no explanation given of the differing requirements with differing soils. Various types of mortar are described in some detail but their effect on rain penetration is not adequately explained. It seems, therefore, that while the student, by a careful study of this book, together with practical training, will acquire the necessary skill to carry out instructions he will not be able to appreciate the reasons for what he is doing and will not be trained to think properly for himself. Unfortunately this omission is only too common in books dealing with building construction.

ANTHOLOGY

Dispensing with the Iron Horse

Brunel was now employed as consulting engineer to various subsidiary lines, later taken over by the G.W.R., one of these being the South Devon Railway, upon which he tried his unfortunate experiment of air propulsion, a new idea beginning to occupy considerable attention in engineering and scientific circles.

The capacity of the locomotive was in those days exceedingly limited ; hills were as much of a difficulty as to our early motor car, and could only be tackled by extra help, sometimes from an auxiliary engine, sometimes from a stationary one with a rope to haul the train. This extra cost retarded the development of railways in hilly counties, yet Devonshire, with its popular coast and moors, was clamouring for a line. The atmospheric system, already tried with good results on the Dublin Dalkey line, appeared ideal for the slopes between Totnes and Newton Abbot. Power to climb was to be supplied from pumping stations, the air acting on a piston laid along the line and connecting with the carriages themselves. Brunel, to whom dazzling temptation was always wont to appear in the guise of a novel idea, tried it experimentally, satisfied himself that it worked successfully, and recommended it for adoption on the new South Devon Railway. Ten pumping towers were built, one of which survives by the line at Starcross to-day, as a memento of this experiment.

At first all went well, and the pleasure of travelling uphill, without smut or smoke, was greatly appreciated by passengers. But faults began to develop in the valves, where the action of weather on leather flaps seemed impossible to overcome, also defects in the pumping machinery. Trains refused to start, ran slow, and arrived late. Passengers, shareholders, and directors alike complained, adjustments and repairs seemed to have no lasting effect, and after a year of disappointments, Brunel, shouldering the blame entirely himself, recommended the directors to give up the system and revert to engines. As he always put capital into his own ventures, his personal losses were very considerable, but those of the South Devon Railway were disastrous. The company was left with a debt of £478,000 which crippled it till it was finally taken over by the G.W.R.

CELIA BRUNEL NOBLE (*The Brunels, Father and Son. Cobden-Sanderson*, 1938).

MARGINALIA

The Georgian Group and Hove Regency

After a long delay due to war-time difficulties, the Georgian Group's Interim Report, 1945, has now been published.

In view of the threat to Brunswick Square and Terrace and other Regency buildings in Hove, two architect members of the Executive Committee made a visit to examine the basis of the Borough Engineer's contentions : first, that the Regency buildings were structurally unsound, secondly, that they were incapable of adaptation to modern needs, and thirdly, that the architects of to-day are capable of designing buildings as good as or better than those of the Regency. The decision was that the first two contentions had no foundation in fact, so that the third, even if true, was irrelevant.

Sir Herbert Baker

We regret to announce the death of Sir Herbert Baker which took place on February 4th. Born at Cobham, in 1862, he received his earliest professional training at the AA and in the office of Mr. Arthur Baker, to whom he was articled. For some time he acted as assistant to Sir Ernest George and Mr. Peto, among his colleagues being Guy Dawber, Edwin Lutyens, and Herbert Wigglesworth, studying meanwhile at the evening architectural school of the RA, where he won in 1889 the Ashpital Prize of the RIBA. In 1892 Baker went to South Africa, where he met Cecil Rhodes, and began a friendship that resulted in a whole series of important buildings in South Africa. Working in association with Lutyens at Delhi, India, Baker was responsible for the Secretariats and Legislative Buildings, including the great circular Council Chamber. After the 1914-18 war Baker was for a time absorbed in the work of the War Graves Commission. Baker's most important works in London were the reconstruction of the Bank of England, India House, Aldwych, and Africa House, Trafalgar Square. Baker was elected A.R.A. in 1922 and R.A. in 1932. In July, 1926, he received the honour of knighthood " in recognition of his services to art," and the next year was awarded the Royal Gold Medal for Architecture. He was created a K.C.I.E. in 1930, and in 1937 Oxford University conferred upon him the honorary degree of D.C.L.

L.C.C. Decision

The London County Council have appointed Mr. C. H. Walker Director of Housing and Valuer.

Manifold Valley

The Standing Committee for National Parks of the Councils for the Preservation of Rural England and Wales is opposing the Leicester Corporation water scheme in the upper Manifold valley.

It claims that Leicester and its neighbouring towns have not justified their desired creation of a reservoir in one of the proposed national park areas. The reservoir, it is stated, will be over two miles long and, up the two lateral arms, some two miles across. This will be a definite disfigurement of this landscape, since the capacity of 10,000,000,000 gallons, which is high in proportion, will flow in ; therefore, for a large part of the year, more water will be drawn off than will run in, and there will be a wide expanse at the sides of gradually shelving muddy bank.

The appeal urges the consideration of alternative sources of supply, and claims that national parks should be a part of farming England with human occupation as an essential part of the landscape. A desolated countryside is not a national park. Attention is also drawn to the damage to the natural beauty of the Dove as well as the Manifold River because of a grave reduction in flow.

Ennerdale Lake

The proposal to dam Ennerdale, in the Lake District, to supply water for industrial purposes has been considered by the Standing Committee for National Parks of the Councils for the Preservation of Rural England and Wales.

The committee decided to urge that, when application was made under the Water Act, the Ministries of Health and Town and Country Planning should take steps to substitute other sources of supply by which the industrial needs of West Cumberland could be met without serious injury to the Lake District.

Rebuilding the House

The contract for the foundations of the new Chamber for the House of Commons has been let by the Ministry of Works to Messrs. Trollope & Colls, Limited. Tenders for the superstructure contract will be invited at a later date.

Crystal Palace Competition

An alteration in the arrangements for the competition for designs of the new Crystal Palace has been announced by Sir Henry Buckland, the general manager.

When the conditions governing the competition were issued, it was found that no ruling had been given as to the building line of the main front of the structure, which was to be assumed 40 ft. back from the edge of Crystal Palace parade. As a number of the competitors had been working to a different line, the assessors issued a further direction that the building line was to be ignored for the purpose of the competition. In order to give the many foreign competitors the fullest possible chance, the closing date for entries has been advanced from February 1 to April 6.

Telecommunications Exhibition

An exhibition *186,000 Miles a Second* was held recently at Charing Cross Underground Station. It was designed by Misha Black and manned by a staff of operators drawn from the London Telegraph Station of Cable and Wireless. The extent and flexibility of the Empire system of wireless and cable routes was shown by a revolving globe 9 ft. in diameter. Among other exhibits was a page from an early ship's newspaper, produced in the s.s. Great Eastern while laying the 1866 Trans-Atlantic cable.

T.D.A. Review

The January, 1946, issue of the *Timber Development Association's Quarterly Review*, in addition to the Committee's Reports and a review by the Chairman, contains an article " Plastics in Competition," which examines the question whether the use of plastics for articles traditionally made of wood will be harmful to the timber trade. The conclusion arrived at is that " with the almost infinitesimally small production of plastics as compared with wood, there cannot be, at any rate for many years to come, serious competition from plastics."

Textiles Exhibition

An exhibition of British Textiles was held during January at Foyle's Gallery ; it is now touring England under the auspices of the Arts Council. The exhibition which included a set of decorative screens explaining processes in the textile industry, was planned and collected by Sylvia Pollak for the British Institute of Adult Education.

War Damage in Germany: Dresden

This is what *The Times* reported on January 24 :—

" The delicate charm of the Zwinger is broken and blasted ; fortunately its galleries were empty, the pictures having been removed to safety early in the war. The Schloss is in ruins. The adjoining Catholic Hofkirche is half destroyed. The Opera House is roofless and burnt-out. The steeple of the Dreikönigskirche is still standing. There is scarcely anything left of the Frauenkirche. The buildings round the Altmarkt and the Neustädtermarkt are empty shells."

However, the article adds that the Opera House (by Semper who lived in London after the 1848 revolution and was patronized by Prince Albert) will be restored in the next twelve months, the scaffolding is already up against part of the Zwinger, and that Schloss and Hofkirche " eventually will rise again."

War Damage in Holland

In answer to a copy of Mr. Clifton-Taylor's letter of last month sent to the Royal Dutch Bureau of Art Historical Documentation, the following supplementary report has been received :

AARDENBURG : The thirteenth century church of St. Bavo in ruins.

ARNHEM : St. Walburgis burnt out—St. Eusebius tower partly collapsed—House of the Royal Commissars a total loss—Weighouse burnt out.
DEVENTER : The old buildings in fairly good condition.
DOESBURG : St. Martin's tower and west part of church blown up.
DOETINCHEM : Large parts of the town in ruins—the pretty eighteenth century Town Hall a total loss—Church in ruins with tower shelled to pieces.
GRONINGEN : Large part of centre and especially district north of market place destroyed—the church survives.
THE HAGUE : Korte Voorhout and Smidswater partly destroyed—French Embassy (1665) and Canon Foundry (by P. Post, 1665) completely gone.
HEUSDEN : Late Gothic Town Hall and tower of church blown up.
MIDDELBURG : Large parts of centre destroyed in 1940—the famous Town Hall and Abbey in ruins—many old houses of importance gone.
OORSCHOT : Church tower severely damaged.
RENEN : The late Gothic church and its magnificent tower have suffered badly.
ROERMOND : Cathedral half in ruins—Maas Bridge (thirteenth century) partly gone—the thirteenth century Minster Church has had little damage.
ROTTERDAM : The most characteristic eighteenth century parts of the city gone. St. Lawrence (Groote Kerk) burnt out and later partly collapsed—the English and Scottish (1695) Churches destroyed.
SLUIS : Town Hall burnt out, tower collapsed.
TIEL : Especially severely hit—St. Martin's burnt out and partly in ruins.
VENLO : St. Martin's tower destroyed.
ZUTFEN : St. Walburgis much damaged.

Altogether 125 church towers were blown up by the Germans or fell victims to shelling. As the report does not mention Amsterdam, Harlem, Leiden, Delft, Dordrecht and Utrecht it can be assumed that they have not had any architectural casualties beyond what Mr. Clifton-Taylor has mentioned.

State of the Livery Companies

The Times has recently followed up its valuable survey of the fate of the City churches during the war (Marginalia, November, 1945) with a detailed survey, along the same lines, of the City Livery Companies, from which the following extracts are taken :—

In 1939 36 livery companies' halls were standing in the City—those of the Armourers and Braziers, Apothecaries, Bakers, Barbers, Butchers, Brewers, Carpenters, Clothworkers, Coachmakers, Coopers, Cordwainers, Cutlers, Drapers, Dyers, Fishmongers, Founders, Girdlers, Goldsmiths, Grocers, Haberdashers, Innholders, Ironmongers, Joiners, Leathersellers, Merchant Taylors, Mercers, Painter-Stainers, Parish Clerks, Saddlers, Skinners, Salters, Stationers and Newspaper Makers, Tallow Chandlers, Vintners, Wax Chandlers, and Watermen and Lightermen.

Of this number 20 have been either completely destroyed, so badly damaged as to involve demolition, or rendered largely unusable. Eleven others have been damaged to a greater or less extent. Three have met with slight damage. Two only are intact.

Many notable buildings are among the 20 destroyed or wrecked. They are those of the Bakers, Barbers, Brewers, Butchers, Carpenters, Clothworkers, Coachmakers, Coopers, Cordwainers, Girdlers, Haberdashers, Joiners, Leathersellers, Mercers, Merchant Taylors, Painters, Parish Clerks, Saddlers, Salters, and Wax Chandlers. The 11 more or less damaged are the halls of the Cutlers, Drapers, Dyers, Fishmongers, Goldsmiths, Grocers, Innholders, Skinners, Stationers, Tallow Chandlers, Watermen and Lightermen. The slightly damaged are those of the Armourers and Braziers, Founders, and Ironmongers. Those which remain substantially intact are the halls of the Apothecaries and Vintners.

The livery companies' halls are almost entirely within the Roman city. One (the Barbers') stood partly on the Wall itself.

If we take the area of the City west of a line passing through Guildhall to Southwark Bridge we find nine halls completely destroyed and one other reduced to a single floor. The Barbers' Hall is one of the most grievous of the losses in this area. The hall, built by Inigo Jones, was perhaps the most beautiful of all. It was originally the courtroom and survived the Great Fire of 1666. Nothing is left now except masses of brickwork. But the destruction of the hall in the first bombing of the City in December, 1940, has disclosed a core of medieval masonry beneath Stuart, and in some cases modern, brickwork.

A little known hall belonging to the Parish Clerks Company in 24, Silver Street had a modern front but was built in the latter half of the seventeenth century. Nothing is left. The Butchers' and Coachmakers' halls, also destroyed, were modern.

The Brewers' hall in Addle Street, near Cripplegate, has also been completely destroyed, with its furniture and very fine woodwork. The remains of two well-known halls face one another in Gresham street, those of the Haberdashers and the Wax Chandlers. The Haberdashers' hall—burnt in 1665 and again in 1838—still retained many of the features of the seventeenth-century building, including an oak screen of five bays and a beautiful Wren ceiling. These are irretrievably lost, but the portraits, plate, and furniture have been saved. The Wax Chandlers' hall was modern, but it stood on a site conveyed to the fraternity in 1545. The ground floor and basement alone are standing.

A fraternity of Saddlers existed in the reign of Henry II, and Richard II granted the first charter of incorporation to the Saddlers' Company, which has possessed three halls in succession in the same site north of Cheapside. The last, now completely destroyed, was built in 1822, and contained some fine fittings and glass from the old hall and a medieval funeral pall.

Between the east end of St. Paul's and Bread Street there is only one block of masonry above ground on the north side of Cannon Street. This is the remains of the entrance to the Cordwainers' hall. The little known but beautiful hall and courtroom of the Company of Painter-Stainers in Little Trinity Lane was destroyed by fire in May, 1941, except for the outer walls, and the bulk of the furniture, including valuable old oak tables, was lost. It was one of the most interesting Caroline buildings in the City.

The Stationers' hall had a narrow escape and lost its fine ceiling, among other damage. The Vintners' hall in Upper Thames Street, one of the most beautiful of all, fortunately remains intact.

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In the eastern part of the City the halls are grouped thickly near Dowgate Hill, which is on the site of the River Walbrook, along London Wall, in Cheapside and Poultry, and Lower Thames Street.

The worst damage in this part of the City was to the halls of the Bakers', Carpenters', Coopers', Clothworkers', Girdlers', Joiners', Leathersellers', Mercers', Merchant Taylors', and Salters' companies. The Mercers' Hall is an irreparable loss. All that now remains is a Victorian entrance carved with the company's arms, on the north side of Cheapside, between Old Jewry and Ironmonger Lane, part of the walling of the Great Hall, and the offices. The company's rich treasures in plate, portraits, and furniture, with much of the old panelling, have been preserved.

The Carpenters' Company have had a hall standing on part of the City Wall since 1457. Its successor, built in 1876 but containing much beautiful work and other treasures from the old building, was wrecked by a land mine in May, 1941, and the destruction of the hall above street level was completed by fire through the explosion of the gas mains in London Wall. Much of the plate was saved, including a set of fine steeple cups of the early seventeenth century, as well as the original records, which are continuous from 1438.

The Girdlers' Hall, in Basinghall Street, was built in 1681 and possessed fine old oak and other treasures, together with a little walled garden. This beautiful little building was destroyed in December, 1940. The company was able to save only a few things, including its early charter, a famous Indian carpet, made in 1634 at the factory of Akbar the Great, some silver, minute-books, and glass—but this was afterwards destroyed at Clothworkers' Hall.

The total destruction of Merchant Taylors' Hall, between Threadneedle Street and Cornhill, is another deplorable loss. The hall was the largest possessed by any City company and the only one preserving definite medieval features. Only the walls of the hall and reception rooms remain, with part of the offices, which are still in use.

Many beautiful and interesting things disappeared in the destruction of the Clothworkers' Hall, in Mincing Lane, in the concentrated enemy raid on this area on the night of May 10, 1941. Although rebuilt in 1860, this hall was linked by its site and traditions to the history of the cloth and woollen trades from the days of Edward III.

Nothing but the shell remains of the Bakers' Company hall in Harp Lane, between Great Tower Street and the river. It had been twice previously destroyed by fire and the building dated from 1719. The Coopers' Hall in Basinghall Street is reduced to its outer walls and basement. It possessed some beautiful carved woodwork from an older hall. The bulk of this has gone and only six pictures were saved, together with the records, which go back to the incorporation of the company by Henry VII.

Salters' Hall, in St. Swithin's Lane, has been destroyed and the surrounding buildings gutted, with the loss of much furniture, portraits and other treasures. The plate and records are intact. This was not an ancient building, but its site has been in the company's possession since 1641. Finally, there is to be found the fragment of an entrance in Joiners' Hall in Upper Thames Street—all that is left. The buildings were modern, but the forecourt contained a late seventeenth-century doorway. The fraternity was incorporated by Queen Elizabeth.

Something less than complete destruction has befallen the other companies in the eastern part of the City. A flying bomb did some damage to the offices of the Grocers' Hall in Prince's Street and did other damage, but left the big hall and the greater part of the building intact. The Drapers' Hall, in Throgmorton Street, was damaged, but remained usable. Its garden is still an oasis in the City. The Tallow Chandlers' Hall in Dowgate Hill, a beautiful building by Wren, has suffered, but not seriously. The Skinners' Hall, nearby, a notable building of about 1670, was more seriously damaged. The oak parlour and clerk's room were entirely destroyed, and some damage was done to panelling in the lovely cedar drawing-room. The Fishmongers' Hall, north of London Bridge, also suffered heavily—it was the first to catch fire both in 1666 and 1940. The court dining-room, court drawing-room, and vestibule were completely burnt out, with their valuable furniture, and other damage was done; but the banquet hall is intact, except for two large stained-glass windows, and the plate has been preserved.

From the Dyers' Hall, in Dowgate Hill, ancient fittings, furniture, charters, and portraits were saved, but the hall, reception rooms, and offices were damaged. The Leathersellers' Company also retrieved ancient charters, muniments, minute-books, the library, and plate when the hall and premises in St. Helen's Place were damaged. Less serious damage was done to the halls of the Armourers and Braziers, in Coleman Street, the Founders, in St. Swithin's Lane, the Innholders, in Coleman Street, and the Watermen and Lightermen's Company, in St. Mary-at-Hill.

British Colour Council

The British Colour Council announces that it has acquired No. 13, Portman Square, W.1, for the post-war development of its services to industry. It is intended that the new centre shall provide a common meeting ground for everyone interested in colour, design and industrial art, and where exhibitions showing the best of Britain's products can be staged by the British Colour Council and by other bodies having interests closely concerned with colour and design.

The British Playhouse

The first two numbers of *Theatre Notebook*, a quarterly of notes and research, October, 1945, and January, 1946, include lists of British Theatres in London and the Provinces, with notes on their history, which it is intended to complete in future issues. This should prove a valuable piece of work in view of the many gaps in what little research has already been done on this subject.

Reunion of Architects

The British Section of the International Reunion of Architects, the object of which is to promote understanding and co-operation among architects, and to lay the foundations of a co-ordinated exchange of information, selected the following officers at its last meeting: President, Professor Sir Patrick Abercrombie; Hon. Secretary, Mr. Ernö Goldfinger; Hon. Treasurer, Mr. F. E. Towndrow.

Announcement

F. H. K. Henrion, who has been working exclusively for the War Office, the Ministry of Information and the U.S. Office of War Information, is now working again as a consulting designer.

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